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The Political Implications of Natural Disasters

Leah Cathryn Wells Windsor

A dissertation submitted in partial fulfillment
of the requirements for the degree of

Doctor of Philosophy
Political Science
International Relations, Methodology

University of Mississippi

2012

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Abstract

When natural disasters like floods or droughts happen, people experience their wrath, losing lives, livelihoods, homes and security. Natural disasters disrupt the status quo, and create social, humanitarian and political needs. In most cases, people turn to their governments to provide for these needs. However, governments vary widely in their ability and willingness to provide for these needs. Citizens evaluate the outcomes of the government's actions in response to their needs arising from the effects of the natural disaster. Much work on the effects of natural disasters has been undertaken by civil war scholars. This project uniquely contributes to our understanding of how natural disasters affect political processes by extending the analysis to the areas of human rights, sub-national social conflict and leadership duration.

Dedication

Ce traité est dédié aux agriculteurs partout.

Acknowledgments

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Chapter 1

INTRODUCTION

1.1 Introduction

When natural disasters like floods or droughts happen, people experience their wrath, losing lives, livelihoods, homes and security. Disasters disrupt the status quo, and create social, humanitarian and political needs. In most cases, people turn to their governments to provide for these needs. However, governments vary widely in their ability and willingness to provide for these needs. Factors like coastal urbanization and rapid population growth have put more people in harm's way and given governments a larger audience whose needs must be addressed. The accelerated pace of occurrences of natural disasters is cause for concern, given the rise in human populations and the increase in the number of people likely to be affected. All governments are increasingly pressed to prepare for and respond to natural disasters, as resources are limited and demand is growing. Citizens evaluate their government's response to their needs arising from the effects of the natural disaster.

Not all societies will be able to respond adequately to the challenges posed by events like droughts, floods, earthquakes and extreme temperatures, and some governments

do a better job at preparing for and dealing with the consequences of natural disasters. For some societies, natural disasters exact a higher death toll and longer-lasting problems. While all societies experience natural disasters, their consequences are not felt evenly.

The ways in which governments respond to natural disasters, and the options for citizens to evaluate their responses, vary by state capacity, government type, and disaster characteristics. Some governments are better prepared for natural disasters and also handle their effects more efficiently and effectively, responding in timely and comprehensive ways to citizens' needs. Other societies are less able to prepare sufficiently and intervene after natural disasters. Because governments are differently willing and able to address natural disasters, the same disaster event will have very different consequences for political behavior across societies. Different disaster types also require varying levels of willingness and ability. By differentiating the types of disasters and the number of people who are killed and affected by them, we can better understand states' responses. These concepts are demonstrated by the following examples in France, Pakistan and Russia.

In June of 1991, Pakistan experienced a serious heat wave which killed hundreds of people. Some died as a result of heat-related illnesses and dehydration. Others were affected by secondary causes like food poisoning from unreliable refrigeration. A continual lack of investment in the nation's power grid taxed the capacity of the electrical industry under the searing hot conditions, causing massive power outages

across the country. Violent protests in the port city of Karachi targeted the offices of the local electricity supplier and disrupted daily life by burning tires in the streets, prompting a repressive response from local police. In the capital, the opposition party staged nonviolent demonstrations to highlight the current leadership's shortcomings in responding to the humanitarian needs of Pakistani citizens.

The people of Pakistan want a consistent supply of electricity and relief from the hot weather. The government is tasked with providing the public infrastructure for electricity and is responsible for maintaining order. After failing to do so, Pakistanis demonstrated both violently and nonviolently. Almost twenty years later in 2010, Pakistan found itself embroiled in a similar situation where rolling blackouts, or "load-shedding," fomented discontent and created similar humanitarian emergencies as were experienced in 1991.

In 2003, the continent of Europe also experienced a heat wave. In France alone, more than 15,000 people died from heat-related illnesses. The hot weather occurred during the period of summer vacation which stranded many urban elderly and other vulnerable people without caregivers or family to look after them. The right-centrist government blamed families for leaving their relatives unattended; families blamed the government for failing to adequately provide for public well-being during a crisis. Following the heat wave, French Health Minister Jean-Francois Mattei resigned his post. In the 2004 elections, leftist politicians gained seats in previously conservative regions as voters punished the incumbent party for their apparent complacency and

inadequacy in dealing with the unusually hot weather the summer before. Most interestingly, the country adopted new legislation to provide a better social safety net for vulnerable populations.

Contemporaneous with the heat wave and election cycles, French citizens participated in protests across the country for various reasons, from war opposition to cuts in social spending. Protest in France is a highly ritualized and legally protected event, complementary with regular elections, which provides another forum for citizens to evaluate their government's policy performance. These protests, while not completely inconsequential, are very different from the events in Pakistan in the way they are contextualized within existing political processes.

In the summer of 2010, soaring temperatures and rampant wildfires created environmental and humanitarian problems in Russia. While seeking respite from the heat at the country's beaches, 1,200 Russians drowned. Smoke from the wildfires hovered over cities, creating air pollution in the arid conditions and health problems for citizens. Estimates of total casualties from the heat and pollution that summer are as high as 56,000. On July 30th, 25 million acres of grain had burned. By August 2nd, the total acres scorched had reached 300,000 million acres.

President Medvedev banned grain exports, driving up global wheat prices. However, and more importantly, upon seeing the anomalous weather conditions, he signaled a shift in state policy toward climate change. "What's happening with the planet's

climate right now,” he spoke on television, “needs to be a wake-up call to all of us, meaning all heads of state, all heads of social organizations, in order to take a more energetic approach to countering the global changes to the climate.”

Protests or mass social complaints were scant during the heat and wildfire emergencies in Russia, in large part due to government’s tightened control over media and public officials, actively suppressing information and quashing dissent. Yet as one of the world’s largest contributors to greenhouse gas emissions, Russia’s official response to the demands of natural disasters was to acknowledge the role of global institutions in helping states solve natural disaster problems as well as the challenges posed by domestic audience costs by skeptical citizens.

In a stable, democratic country like France which has both political will and infrastructural capacity, the domestic political system was robust enough to weather public discontent through democratic means in spite of the high number of casualties. In an unstable autocracy like Pakistan, a comparatively low number of casualties resulted in public violence but no policy reforms. Furthermore, in the short- and long-term, the Pakistani government failed to address the fundamental causes of the unrest by increasing the nation’s capacity for generating electrical power. By contrast in Russia, an emerging democracy which experienced by far the largest number of heat-related casualties, public protest was oddly absent, and the government sought relief by turning to the international community for help.

Government type and state capacity matter to the natural disaster narrative because they determine a country's approach to disaster preparation and post-hoc responses. Government type determines a state's willingness to address natural disaster problems, and state capacity determines its ability to do so. Governments can be neither willing nor able, alternately willing and able, or both willing and able to handle political and social problems posed by natural disasters. States' willingness and ability contextualize both their preventive and interventive approaches to natural disasters.

As rational actors, leaders in all states pursue policies that maximize their time in office, including providing both public and private goods to their supporters. Preparation for and responses to natural disasters are public goods. Democracies should be more willing than non-democracies to prepare for and respond to citizens' needs since leaders retain office by providing public goods to a large constituency. Non-democracies, on the other hand, are theoretically under-prepared for natural disasters and face challenges in responding to citizens' needs since leaders retain office by providing private goods to a small coalition of supporters.

However, willingness to respond is only part of the explanation. States' capacity to respond also matters. State capacity can be understood as a composite of institutions, economics and infrastructure. States with large economies may lack political will to respond to natural disasters, but have the capacity to prepare and respond. These measures vary depending on the type of natural disaster. For example, addressing epidemics is different from addressing earthquakes, yet state capacity

matters for addressing both. States can address epidemics by vaccinating children and supporting an adequate level of medical professionals. States can respond to the threat of earthquakes by maintaining evacuation routes, for example.

The combination of states' willingness and ability to prepare for and respond to natural disasters affects their overall vulnerability. Vulnerability refers to the ways in which states, political processes and citizens are affected by natural disasters. Natural disasters can make state vulnerable by damaging their social, political and economic infrastructure, disrupting or destroying centers of production. Leaders of states are also vulnerable, since they are subject to their citizens' evaluations of their performance in office. Citizens are also vulnerable to natural disasters, like being displaced from their homes, facing food insecurity and under certain circumstances, oppression by the government.

The types of possible natural disasters characterize the ways in which states can respond to them. One type includes weather events, like extreme temperatures, floods, droughts and storms. Another type includes epidemics, insect infestations and events like landslides and avalanches. A third type includes earthquakes and volcanoes. While a one-size-fits-all approach toward preparing for and responding to these types of natural disasters might not work for all states, we can generalize a state's overall capacity to respond to these varying events.

1.2 Contribution to the Literature

This human-environment relationship is not a new research agenda; rather, it has been the focus of much scholarly investigation already in both the conflict and cooperation literature. For example, previous work has examined how natural resources are used to fund conflicts, and how natural disasters affect conflict likelihood. Other work has shown how states cooperate over shared natural resources as well as long-term issues like pollution and climate change. However, in spite of the breadth and depth of research done, many questions remain regarding political behavior, governance, and natural disasters, whether related to climate, environment, or geology. This project looks at some of the under-explored areas of political science scholarship related to natural disasters and governance, like their effect on the tenure of leaders in office, their effect on human rights, and on social conflict.

In the past decade, scholars have gained access to highly refined data through geographic information systems (GIS) and sub-regional data on human behavior and exogenous disaster events which has allowed them to closely model the relationship between political behavior and disasters. Much of the scholarship on the relationship between natural disasters and governance has originated in the civil war literature. This research has been predicated on two fundamental beliefs: that Africa is the most likely place to experience the deleterious consequences of natural disasters, specifically those related to climate; and that civil war is a likely outcome. These assumptions are not entirely baseless, given the governance challenges many African states face, as well as their existing precarious humanitarian situations, food inse-

curity and prevalence of conflict. Yet only by expanding the geographic range and political outcomes can we learn more about how natural disasters affect people and governments.

This research seeks to extend the scope of analysis beyond Africa and beyond civil wars to explain the relationship between natural disasters and political processes. Because of this narrow focus, many interesting questions remain unanswered about the effect of climate on governance and people. For example, what effect does climate have on leadership tenure and regime stability? Do natural disasters incite other domestic reactions that besides civil war, like riots, demonstrations, protests, revolutions and coups? How do natural disasters affect states' human rights practices?

This project seeks to explore these questions, specifically relating natural disasters to the following: the duration of leaders' tenure in office; states' likelihood of experiencing an intrastate conflict; the status of human rights practices; and states' participation in climate and environmental international regimes. By investigating these relationships, I hope to provide further insight into why, under some conditions, climate change produces cooperation and conflict under others.

Much of the existing research on environment and political behavior has come from the civil war literature. Civil war scholars have looked at environmental factors that initiate and exacerbate intrastate conflicts, including resource scarcity and ex-

ogenous disaster events like rainfall and earthquakes. This research provides a rich foundation for continuing to explore other ways that natural disasters affect aspects of governance.

1.3 The Nature of the Political System

Natural disasters present a problem for governments which is that they are held accountable for events beyond their control. Unlike war events or economic shocks, which can be attributed to individual leaders, political systems or specific policies, natural disasters are not generally a result of government policies. Earthquakes, extreme temperatures, the amount of rainfall whether scarce or plentiful, and other disaster events are not controlled by governments. Their effects, however, are contextualized by the society in which they occur. Flooding can be mitigated by land-use policies, including building levees and dams, and exacerbated by deforestation. Epidemics are more devastating in countries where fewer people are vaccinated and with fewer medical personnel per capita. Electrical generation which fuels indoor heating and cooling helps alleviate the effects of extreme hot and cold temperatures. The political demand for these provisions varies by government type, and the ability to provide them varies by state capacity.

Collier & Hoeffler (2005) specifically argue that government type matters to a state's strategy for dealing with resource conflicts for domestic accountability to its constituents, the source of its legitimacy, and the range of policy tools at its disposal for relating to its citizens. Gleditsch & Ward (1997) note that democracies are marked by active citizen participation, regular and meaningful electoral competition, protec-

tion of civil and legal rights, liberal economies and focus on human rights. Thies (2010) proposes that state capacity, viewed as the ability of the state to raise funds through taxation, conditions governments' approaches to handling crises like natural disasters or civil wars.

Natural disasters are economically and politically costly. States must pay for these costs, and the variety of tools which they have at their disposal varies depending on whether that state is a democracy or not (Cohen & Werker, 2008). Consequently, it follows that the options for citizens to evaluate the effectiveness and responsiveness of their government also varies according to the political opportunity structures therein. In other words, in some states, citizens evaluate their government's performance through elections, and on other states, evaluation happens in the streets. Elections and demonstrations are not necessarily mutually exclusive, nor are they isolated to particular societies. However, the political consequences of contentious behavior do vary by society.

Governments vary in their provision of public goods. Because leaders of democratic states are accountable to a large constituency, they have an incentive to distribute public goods widely. These public goods may take many forms, like investment in infrastructure and social services. Democratic governments also have stronger domestic institutions than do non-democracies. These flexible and responsive domestic institutions allow democracies to weather the effects of natural disasters without incurring a systemic breakdown.

In democracies, public funds may be allocated to build or repair infrastructure like levees, to compensate cities and citizens for economic losses, or provide emergency services like evacuation or protection (Healy & Malhotra, 2009). Democracies provide these goods with funds from popular taxation. With higher taxation rates there is also an accompanying popular mandate for distributive policies. Thus, citizens in democratic states expect that government will utilize public funds for public problems. Citizens in autocratic states do not share these same expectations for benefiting from the provision of the public goods.

Autocracies, which provide comparatively fewer public goods than democracies, are less likely to allocate national resources to address the consequences of natural disasters. Autocracies generally spend less per capita on public goods than democracies do. Because leaders of autocracies remain in power by providing private goods to a small group of supporters, they should be less inclined to use their own domestic resources to provide for the public well-being following natural disasters as this would dilute the pool of resources available to ply their supporters for continued tenure in office. Autocracies' extractive capacity, i.e. their ability to obtain revenue from taxation from their citizens, tends to be less fruitful than in democracies.

¹ As a consequence, citizens have less financial investment in their state. States may be more inclined to offer international assistance to victims of natural disasters

¹A future theoretical area of exploration is the subset of countries reliant on natural resource rents like oil as a major component of their national income. These countries often fall into the "unwilling but able" category.

in non-democracies as an expression of outreach and sympathy for their suffering as a result of the disaster and their suffering under a leader unwilling to help her people.

State capacity is distinct from political will. It encompasses states' budgets prioritizing disaster prevention and intervention. States with sizable economies may theoretically be able to address their citizens' needs, like public health provision through vaccinations, emergency response infrastructure, and compensation for losses, but ability does not ensure action. The source of state revenue, like resource rents, trade in primary commodities, or from popular taxation, determines the size of the pool of resources available for expenditures on disaster mitigation.

In summary, the political effects of natural disasters are conditioned both on regime type and on state capacity. States having varying degrees of willingness and ability to both prepare for and address the consequences of natural disasters.

1.4 Leadership tenure

The central question of this chapter addresses how changing environmental conditions affect leaders tenure in office. Leaders are subject to their citizens' periodic evaluations of their performance, and natural disasters provide opportunities for citizens to reward their leaders with extended tenure in office or punish them with removal from office.

Natural disasters create unforeseen costs to states, both those that are comparatively well- and ill-prepared. Leaders in states experiencing natural disasters ought

to be concerned about their tenure in office, since leaders that fail to effectively address these face removal from power. Natural disasters can create both immediate social needs which citizens expect their leaders to address through political mechanisms, and longer-term needs that have more durable effects. Natural disasters can disrupt and destroy aspects of a state's economic sectors, especially agriculture, and as such can have multiplicative effects on leaders' time in office. In other words, citizens evaluate leaders' direct responses to natural disasters as well as punishing or rewarding them for the economic conditions that follow.

Leaders are rational actors who seek to maximize their time in office. Democratic and autocratic leaders have different mechanisms for maintaining power. Leaders in democracies stay in office by providing public goods to a large constituency; leaders in autocracies stay in office by providing private benefits to a small constituency (Mesquita *et al.*, 2002). Leaders in democracies and autocracies also have different term limitations, as determined by their respective political institutions and the constituency on whom they depend for ratifying their leadership. The length of democratic leaders' tenure is generally shorter than that of their autocratic counterparts. Democratic and non-democratic leadership transitions have dissimilar characteristics. Democracies are marked by regular, competitive and fair electoral systems. Leaders of democracies are more likely to respond more quickly to natural disasters because they are accountable to inflexible election timelines, whereas autocrats are more likely to hedge their bets on retaining office and wait out natural disasters.

Previous research on regime tenure has found that natural natural disasters do affect leadership duration. Zhang *et al.* (2007a) examined several centuries of conflict and climate data in China. They find a strong relationship between onset of cold spells, dynastic change and number of wars. They note that, “Although cold phases reduced agricultural yields, the outbreaks of warfare generally lagged behind the onset of cooling because of social buffers (i.e., granary storage).” They found that in China, most of the dynastic collapses and changes happened following cold phases. Zhang *et al.* (2007b) extended this analysis to Europe and found a similar relationship during the Little Ice Age. It is noteworthy that variations in climate patterns happen along a continuum, like increased and decreased temperatures and rainfalls, at times producing floods or droughts and ensuing famines and crop failures. In the case of the effects of the Little Ice Age on China and Europe, lower temperatures created conditions for social tensions and regime instability rather than higher temperatures.

The work of Zhang and Lee demonstrates an empirical relationship between disasters and regime stability, and a natural starting point to question how post-industrial and post-institutional society differs from previous eras. The dense international network of institutional “safety nets” provides states with more options for managing domestic crises, as do technological advances, that can help states mitigate negative consequences, like civil disturbances or loss of leadership (Midlarsky, 1998). The discipline would benefit from contemporary analysis of the effects of natural disasters on leadership tenure, extending the types of natural disasters beyond extreme temperatures to include more phenomena.

1.5 Contentious Behavior

This chapter examines the ways in which natural disasters impact states' likelihood for experiencing contentious behavior, like protests, demonstrations, strikes and revolutions. Contemporary scholarship has explored sub-national conflict in the form of civil wars. Scholars have explored variations in the measurement of conflicts and the types of environmental concerns that states face, from dependence on primary commodities vulnerable to looting, to temperature fluctuations and rainfall deviations. Civil war as an outcome has received the most attention

The operationalization of intrastate conflict matters to the results. A dichotomous variable that measures presence or onset of civil war fails to capture some of the important behaviors that fail to meet the arbitrary thresholds set, whether at more than twenty-five or more than one hundred battle deaths. I propose using a measure that captures types of intrastate conflict, ranging from low-level domestic disturbances like protests and demonstrations to more violent incidents like riots and revolutions. To most accurately make claims about the effect of natural disasters on contentious behavior, it is important to consider a range of potential outcomes.

This chapter contributes to the scholarship on climate and governance by specifying the dependent variable as a range of values describing contentious domestic behavior including protests, riots, strikes and revolutions (Ai & Norton, 2003). As previously discussed, because Africa is rife with intractable civil wars and myriad social problems, researchers have rightly focused on seeking explanations for the intensity and

durability of the conflicts there. Many of the explanations of African civil wars have included poor governance and weak institutions, economic shocks, and recently, the effects of climate on crop yields and food prices. Yet while most attention has been focused on using variables to understand civil wars on that continent these factors are not unique to explaining problems in Africa.

The most recent research on climate and conflict utilizes geospatial climate models to estimate the amount of rainfall. These studies have focused exclusively on Africa. Hendrix & Glaser (2007) asked if extreme weather events exert a significant influence on political disturbances and social conflict, and whether these forms of conflict could potentially destabilize the government order. They examine five mechanisms through which hydro-meteorological disasters may lead to socio-political conflict: water access, price disputes, migration, state intervention and natural disasters. Using the Social Conflict in Africa Database, they find a positive curvilinear relationship between rainfall deviation and social protest. Further, and importantly, they find that both wetter and drier years are associated with an increase in social protest. Burke *et al.* (2010) use rainfall as an instrumental variable for economic growth in 41 African countries and find that weather shocks do affect civil conflict, but through the mechanism of economic growth. They find that a negative growth shock of five percentage points increases the likelihood of conflict by one-half the following year.

One of the strongest declarations of the relationship between climate and conflict using GIS technology is from the research of Burke *et al.* (2009a) who find that in

the Sahel, temperature and rainfall norm deviation predicts onset of civil war. An immediate refutation of this work from Buhaug (2010) challenges the former's conclusions on methodological grounds. Still, this strand of research sets the threshold of conflict at civil war, which likely misses less organized contentious politics and regime stability, and does not capture the range of possible outcomes of changing environmental conditions on human behavior by narrowly focusing only on the Sahel.

One reason given for focusing on Africa is the preponderance of people reliant on subsistence agriculture, which makes them particularly vulnerable to changes in weather and climate. Agriculture plays a key role in understanding how natural disasters influence contentious behavior. When natural disasters disrupt food production or distribution, events like food riots become more likely. To investigate only African countries misses the full range of possibilities and potential explanations for how natural disasters affect states and the people within them.

For this reason, I believe it is imperative to take a global perspective on this problem, including the effect of natural disasters within the international system on individual countries. Global natural disasters that disrupt the production and distribution of food can create opportunities for contentious behaviors in countries with mild or minimal exposure to natural disasters. For example, the wildfires in Russia and Australia increased the global prices of wheat, which created economic stress on other countries leading to local protests over increased food prices.

Investigating other potential sources of contentious behavior, like revolution, rebellion, civil war, demonstrations and coups, Lichbach (1989) asserts that the economic inequality contributes to political conflict. Oberschall (1978) discusses two theories of when social conflict will happen: the breakdown-frustration approach, and the mobilization-solidarity approach. Conflict resulting from natural disasters is likely of the breakdown-frustration ilk. This theory is built upon the approach taken by Gurr (1968) toward relative deprivation, whereby citizens seek redress of social inequalities by enacting concerted campaigns of contentious behavior. The relative deprivation in the natural disasters scenario is rooted in the inability of governments to adequately respond to the magnitude of the disaster with adequate social relief, and the inability of citizens to meet their basic daily security needs of food, shelter and security. Social inequality and relative deprivation have featured prominently in explaining the presence of contentious behavior, and there is good reason to believe that natural disasters highlight and exacerbate these problems.

Democracies may be as likely as non-democracies to experience contentious behavior, like demonstrations and protests, following a perceived inadequate government response to a natural disaster. However, the outcome of the contentious behavior will be different for democracies; it is less likely that protests will devolve into a deeper conflict or become a major political cleavage within society. In autocracies, protests over government responses to natural disasters may ignite existing discontent and drive a deeper wedge into a longstanding social cleavage. A government's response to a natural disaster may give an aggrieved group a reason to mobilize.

1.6 Human Rights

This chapter extends the analysis of the effects of natural disasters to look at the human rights conditions and practices in countries experiencing natural disasters. Natural disasters can negatively effect the protection of human rights in two ways. Basic human rights, as protected under the Universal Declaration of Human Rights, include the right to food and shelter Assembly (1948). First, following natural disasters, these human rights may be the first casualties as disasters often deprive people of access to food and displace them from their homes. Second, natural disasters can exacerbate existing social conflicts or provoke new ones. Human rights, like freedom from oppression or persecution, may be threatened when natural disasters happen since governments can opportunistically violate the rights of marginalized or opposition groups, for example.

These two types of human rights are very different in nature, the former being passive and the latter being active. Deprivation of basic human rights like food and shelter does not necessarily indicate a government's endorsement of policies that make such violations possible since natural disasters create dire humanitarian circumstances which even the best prepared governments can struggle to address. Alternately, governments may deny humanitarian relief or adequate responses to marginalized groups in society or those not necessary for their continued tenure in office. However, active violation of human rights through extrajudicial killings, or imprisonment for political reasons, may indicate that the government is utilizing the natural disaster as an opportunity to commit these crimes.

Natural disasters may not affect all members of society equally. Already vulnerable populations, like political, ethnic and religious minorities, have less access to social protection and may lack formal channels for redress of grievances. Their pre-existing precarious social positions may put them more at risk for experiencing both the ill effects of natural disasters and for opportunistic repression by their government. As yet, however, the relationship between natural disasters and both types of respect for human rights is unspecified. Protection of basic human rights, like access to food and shelter, are likely to suffer in all countries experiencing natural disasters. However, democracies should have better human rights practices than non-democracies which are more susceptible to abusing human rights because they lack democratic institutions that would preclude worsening of human rights practices (Francisco, 1995).

Democracies and non-democracies vary in their preparation for natural disasters, including policies to mitigate their severity like immunizing children, building levees and maintaining roads for evacuation. Higher-order human rights protection, like freedom from oppression, may falter following natural disasters as governments seize opportunities to repress minority groups, for example. A rigorous analysis of the relationship between natural disasters and human rights practices should provide important insight into the circumstances under which people are most vulnerable.

1.7 Conclusions

Natural disasters likely to affect all states in the international system. Natural disasters are costly in economic, humanitarian and political terms, and disrupt the status

quo when they occur. States have vary in their willingness and ability to address natural disasters both in terms of preventive and compensatory measures. Natural disasters contribute to state vulnerability in several ways, including impacting their economy, affecting leaders' tenure in office, making contentious behavior possible, and creating conditions that worsen citizens' human rights, like access to food and housing.

This work builds on the civil war literature, which has laid the foundation for understanding how natural disasters affect political behavior. The empirical chapters extend the analysis to include contentious behavior, human rights violations, and leadership tenure. The subsequent chapters include empirical evaluations of these political phenomena.

Chapter 2

POLITICAL BEHAVIOR AND NATURAL DISASTERS

2.1 The political consequences of natural disasters

“Disasters are more than extraordinary physical events; they attain human significance through the sociopolitical contexts in which they occur (Davis & Seitz, 1982).”

Natural disasters like droughts, extreme temperatures and floods destroy crops, infrastructure and homes. They create panic, instability and uncertainty, and disrupt the status quo in society. People look to their government to respond to their needs, and they evaluate their leaders' and government's responses to natural disasters. People reward and punish their leaders for their disaster-related policies and responses. Natural disasters can provoke civil unrest as well. Natural disasters happen in all societies, but their effects are not uniformly felt. Some states are less equipped to deal with destructive natural forces and aftermath. States vary widely in their disaster preparation plans, provision of public goods, government types, institutions and infrastructure, geographic location and economic sectors.

States vary in their willingness and ability to respond to natural disasters, based on the type of government in power and the resources available for them to invest in disaster prevention and response. A state's willingness is determined by the type of government in power, and the size of the constituency leaders are accountable to. A state's ability is determined by its economy and domestic institutions. Willingness and ability affect states' vulnerability to the political consequences of natural disasters. In this chapter I present a theory of how natural disasters affect political behavior in the international system. First I describe states' willingness and ability, and how the outcomes of these terms influence the ways in which natural disasters differently affect states. Then I address the scope of natural disasters, including their types and characteristics. Then I present the ways that states' varying willingness and abilities create different political vulnerabilities, including regime stability, contentious behavior, and protection of human rights.

2.2 Natural disasters make states and people vulnerable

Natural disasters can displace people from their homes and decrease the availability of food, affect their livelihoods, and make their physical security more precarious. Natural disasters create many levels of vulnerability for citizens, leaders and states. Countries are vulnerable as disasters destroy infrastructure and states' economic engines, like industry and agriculture. As chief policymakers, leaders and heads-of-state are vulnerable to citizen evaluations of their performance following natural disasters. A state's vulnerability to natural disasters depends on its willingness and ability to prepare for and respond to events like floods, extreme temperatures and earthquakes.

Natural disasters are both politically and economically costly events. Natural disasters can destroy components of states' economic sectors, like infrastructure for production of goods as well as crops for consumption and export. They also destroy homes and disrupt the lives of economically productive workers, contributing to a decline in both personal income and state wealth. Natural disasters are politically costly for leaders who are responsible for the policies that contextualize the states' preparation for and mitigation of natural disasters, as well as the disbursement of funds for compensation and reconstruction after such events.

Two key determining factors influence how states manage natural disasters: government type, and state capacity. Political willingness is a function of government type, whether the state is democratic or not. The relative ability to cope with climate-related natural disasters can be understood in terms of state capacity, the strength to weather economic shocks created by natural disasters.

The outcomes of natural disasters are conditioned on the responses of the government of the state in which they occur. In "Markets and States in Tropical Africa," Robert Bates describes the predicament of growth and development in Africa, related to weather and climate as well as the roles of marketing boards and government policies on production, prices, development and political institutions (Bates, 2005). Droughts and famines are mitigated by good government policies and worsened by market inefficiencies, privileging certain social or political groups, and investing in

primary commodities rather than on higher value products in the market chain. The reach and devastation of natural disasters is strongly dependent on the capacity of states to “weather the weather.” Bates’ describes problems in tropical Africa, but as I demonstrate here, the argument is applicable worldwide.

A state’s willingness is determined by its government type. Democracies should be more willing than non-democracies to address problems related to natural disasters. A state’s ability is determined by its economic ability to prepare for and respond to natural disasters. States can have either high or low capacity and high or low willingness to respond to natural disasters. States with both high willingness and ability are likely to have the following characteristics: robust, diverse economies; high per capita income; fair, participatory, and regular elections; and competent emergency intervention infrastructure. States with both low willingness and ability tend to be primary commodity exporters, and have low per capita income, weak electoral institutions, and weak emergency intervention infrastructure. A state’s capacity, its willingness and ability to address the consequences of natural disasters, characterizes their vulnerability to these events.

States can show vulnerability to natural disasters in several ways. For example, they can suffer long and short-term economic losses, political instability, contentious behavior or conflict. A state with both high willingness and high ability to address the consequences of natural disasters is likely to have a lower vulnerability to them, as outlined in Table 2.1. States with low willingness and ability are likely to have

a high vulnerability to natural disasters. States with alternately low and high willingness and ability have a medium risk of vulnerability. In other words, states who possess and act on their capacity to prepare for and weather the effects of natural disasters should be less vulnerable to devastating economic losses, to political instability, to conflict or contentious behavior. States' vulnerability can change over time, as government types change and economies evolve, and as more natural disasters affecting more people happen worldwide.

Conversely, states with low willingness and ability are more vulnerable to economic, political and conflict problems created by natural disasters. Vulnerability is not necessarily a foregone conclusion, however.¹

Table 2.1. Willingness, Ability and Vulnerability

Willingness	Ability	Vulnerability	Examples
High	High	Low	United States, France
High	Low	Medium	Singapore, Netherlands
Low	High	Medium	China, Russia
Low	Low	High	North Korea, Sudan, Haiti, Pakistan

¹States with low willingness and ability to cope with natural disasters can offset their vulnerability by soliciting international humanitarian and economic assistance. Future research can pursue the mitigating effects of humanitarian assistance on states' vulnerabilities.

States with high willingness and ability have low vulnerability to the negative effects of natural disasters because they have the political incentive to respond to their citizens needs and the resources to provide for them. Countries with neither the willingness nor the ability to accommodate the threats posed by natural disasters have high vulnerability as they lack both the incentive and the resources to address problems created by natural disasters. For countries with either willingness or ability, government type should be more important than state capacity. States with the political will to address natural disasters have the motivation to seek the resources to address disaster-related problems.

In the next sections, I will discuss in more depth the ways in which government type and state capacity affect states' willingness and ability to address problems posed by natural disasters.

2.3 Willingness

Natural disasters disrupt the status quo and create public emergencies. People often lack the ability to care for themselves when faced with natural disasters; in these instances, they look to their government to provide collective goods. Government type conditions a state's willingness to respond to natural disasters. Democracies should be better than non-democracies at both disaster preparation and response. As compared to autocracies, democracies are better at providing public goods, like security and infrastructure (Boix, 1999).

The accountability leaders feel to their constituents can be characterized in terms of both the selectorate and the winning coalition (Mesquita *et al.*, 2002). The selectorate refers to the part of the population eligible to participate in selection of leaders, and the winning coalition is a subset of the winning coalition necessary for a leader to gain or remain in power. In democracies, the selectorate and winning coalition are roughly equal in size. In other words, leaders must appeal to the median voter and pursue policies which benefit the greatest number of people to achieve or maintain political office. However, in non-democracies, leaders may ignore the demands of a significant proportion of the population because they can remain in power by appeasing a much smaller winning coalition with private benefits.

This means that for disaster preparation and response, democracies should be better prepared because they are perpetually beholden to a larger constituency to provide public goods. Moreover, these public goods, like roads, infrastructure, electricity generation, public services like health care and security, are not unique to disaster preparation and response, but rather provide a robust existing social “safety net” for the circumstances when natural disasters do occur.

Collier & Hoeffler (2005) specifically argue that government type matters to a state’s strategy for dealing with resource conflicts through domestic accountability to its constituents. In a democracy, legitimate governance is ratified through widespread political participation, through active and competitive recruitment of the executive officeholder, official term limits, and the presence of open elections. Gleditsch &

Ward (1997) note that democracies are marked by active citizen participation, regular and meaningful electoral competition, protection of civil and legal rights, liberal economies and focus on human rights. Governments calculate their disaster responses giving consideration to their political costs. Broad domestic political costs like those characteristic of democracies dissuade governments from pursuing policies that lead to suboptimal social and humanitarian outcomes, like human rights violations.

Leaders with a strong incentive to provide public goods, i.e. democratic states, differ from non-democratic states which have comparatively less incentive. Democrats are reliant on a responsive and active selectorate to remain in office, and seek their approval through public policies that benefit many. Autocrats and leaders of non-democracies, on the other hand, are more empowered to ignore the problems facing large swaths of the population since their priority is to maintain the support of their winning coalition. Furthermore, autocrats can be said to act rationally by denying the provision of public goods following a natural disaster because doing so dilutes the pool of available resources necessary for appeasing their winning coalition and by extension, remaining in power.

Rarely is it clearer to people whether or not their leaders are attending to their needs than in the time during and following a natural disaster. Following Hurricane Katrina in 2006, many residents in states along the Gulf of Mexico cost criticized the government's response, including evacuation measures and provisions for those unable to leave, assistance from the Federal Emergency Management Agency (FEMA),

and conduct of law enforcement officials in the immediate aftermath. This disaster highlighted many institutional shortcomings, including insufficient levees, inadequate temporary housing, and civil and human rights violations rep (2006). Tens of thousands of people were relocated to cities throughout the United States, including Houston, Memphis, Denver and Jackson, Mississippi. In the subsequent local and state elections, many politicians' careers ended when remaining residents voted them out of office (Malhotra & Kuo, 2008).

Fifteen years earlier in 1991, the extreme heat in Pakistan demonstrates similar shortcomings, with different outcomes. Hundreds of people died and many thousands more were affected by the heat wave. Their suffering was not alleviated by the government which had failed to invest in its electrical grid, despite both an increase in population and demand for power. Stretched beyond its capacity, the electrical infrastructure was stretched beyond its capacity and resulted in power failures. The people, angry at the government's intransigence, demonstrated outside the local power plants and in the capital city. Other examples of contentious behavior resulting from natural disasters include food riots, where crop failures can lead to increased food prices if not met with government support. ²

²High-profile natural disasters do create a sense of urgency for international responses, like the tsunamis in Indonesia and Southeast Asia in 2004, Haiti in 2010 and Japan in 2011. Countries also routinely send humanitarian assistance for less visible disasters, like droughts, floods and epidemics. International assistance can serve to offset the political consequences which states may face absent such aid, as the donors subsidize the government's financial responsibility out of humanitarian concern for those affected (Cohen & Werker, 2008).

The case of Singapore provides a useful contrast. While some disaster prevention and mitigation can be quite costly, like investing in increased electricity generation, other forms are relatively simple and require little more than political will. Implementing vector control to thwart the spread of Dengue fever involves educating people to wear clothing that covers exposed skin, using mosquito netting and deet, and eliminating the habitats where disease-carrying mosquitos thrive. In 2005, nearly 14,000 people were infected with Dengue fever in Singapore, and 19 died. Local officials held town meetings, enforced high fines for failing to remove standing water, enacted public awareness campaigns, and increased the budget for clearing storm drains from \$2.5 million to \$7.5 million. They also enlisted the help of girl scouts nicknamed “mozzie busters” as well as a “weekend blitz” of more than 700 trained officers to help identify problem areas and raise awareness (Koh *et al.*, 2008). These effective measures require more political will than state capacity.

On the other hand, governments may delay preventative measures to thwart future problems related to natural disasters because the expected gain on returns in public infrastructure are not strong enough (Achen *et al.*, 2004). In systems where the leaders only depend on the support of a small audience to remain in power, there is a disincentive to provide public benefits through disaster relief and compensation. Leaders may also delay their response and hold out for international hand-outs. With regard to disaster preparation, an ounce of prevention is not always worth a pound of cure. Initial research on disaster preparedness indicates that while preventive measures are cost-effective, they are ranked low amongst constituent priorities (Achen

et al., 2004). On the other hand, post-hoc expenditures are regarded as very important and help citizens evaluate their leaders policy performance.

Similarly, governments may choose not to respond at all to natural disasters for the same expected utility reasons. If the disaster happens to a constituent group not essential to their tenure in office or in power, they may lack an incentive to respond at all. If natural disasters help to displace, marginalize or disempower an opposition group, the government in power could justify a null response. A government may also choose not to respond because they do not have the requisite resources to address the range of problems nor the political will to do so. The North Korean famine during the 1990s exemplifies this situation. In a country of 22 million people, between one and three million people died from preventable hunger-related illnesses with multiple origins. These include an economic downturn and social austerity measures, susceptibility to flooding due to deforestation, destruction of grain storages, and inability of the central government to implement palliative policies.

Government leaders may blame the preceding leadership for failure to adequately prepare for or respond to natural disasters. Opposition parties or factions may blame majority parties for the same reason, as well as to capitalize on political opportunities that natural disasters present. These opportunities include articulating grievances and mobilizing their constituency. Most interestingly, governments also blame their own people for the aftermath of natural disasters. Following the 2003 summer heat wave in France where more than 15,000 people died, the incumbent

government blamed French families for going on vacation to the beaches and countryside and leaving their vulnerable elderly family members at home in the cities, many without air conditioning or access to public places to seek refuge (Poumadre *et al.*, 2005). French voters harshly rejected this criticism and swiftly voted out of office many incumbent representatives from conservative parties in favor of more liberal leadership that subsequently passed comprehensive legislation extending protection against natural disasters to vulnerable members of society like the elderly.

Russian officials blamed the deaths of their constituents during the heat wave and wildfires during the summer of 2010 on drinking and drowning while seeking refuge at the beaches. Similarly, the early 2012 cold wave which affected northern Europe and Eastern bloc countries has elicited equivalent blame. Ukrainian officials faulted their intoxicated constituents for cold-related deaths (Elder & Elder, 2010). The Russian and Ukrainian cases have not unfolded like the French case did, where citizens became outraged by the audacity of government in blaming them rather than assuming responsibility themselves. While blame may be a quick and cheap strategy for governments, it is neither a solution to the problem nor uniformly effective in satisfying the public's needs following natural disasters.

If, during the course of the natural disaster or the government's response to it, the integrity of civil or political rights is violated, people may seek redress of their grievances through the courts. In states with an independent judiciary, this is a viable strategy. States which use their military or police as first responders may

incur criticism that those responsible for providing security were also perpetrators of civil or human rights violations. The ability of the judiciary to function as a tool of redress certainly varies between states, but it can be an effective instrument for seeking remedy. People may also work through the legislature to develop programs and laws for responding to natural disasters.

States' willingness may also be influenced by future repercussions via domestic institutions like the courts. Leaders of states with an independent judiciary may fear future punishment so they are more inclined to protect their citizens' basic human rights. For leaders of states without an independent judiciary to uphold the rule of law and the rights of citizens, leaders have little reason to fear future repercussions from failing to protect, or outright violating, citizens' human rights following natural disasters.

Flexible and responsive domestic institutions allow democracies to suffer the effects of natural disasters without incurring a systemic breakdown. The types of responses that governments choose, and the ways in which citizens evaluate their government's responses, are both determined by states' willingness and ability. For example, it would be very unusual to witness a coup in a democratic country following natural disasters, since robust and well-functioning institutions should provide for the public good and address people's immediate and long-term needs, as well as provide formal institutional mechanisms through elections and the court system to hold leaders accountable.

Non-democracies are often characterized by incoherent and inconsistent application of institutional procedures. These states may face coordination problems or have allegiances to their core supporters which either encourage or discourage providing assistance to those affected, especially if they are from a minority group. Since democratic leaders are accountable to a wide constituency, while non-democratic leaders are accountable to a smaller constituency, provision of assistance following natural disasters is highly dependent on the state's characteristics. In states where natural disasters exacerbate existing grievances, the political opportunities for political entrepreneurs may include a coup d'état, suspension of elections or issuance of a general state of emergency that empowers the current leader with more autonomy or authority.

2.4 Ability

State capacity characterizes the ways that governments approach their strategies for managing the demands of climate-related natural disasters. There are several critical components of state capacity: economic size and diversity; military professionalization; and domestic institutions. State capacity is different from government type as it defines a country's ability to respond to natural disasters. State capacity and government type are often grouped through terms like "liberal democracy," and while related, these two concepts are distinct. States vary in their capacity both to prepare for and respond to natural disasters. These two concepts - preparation and intervention - are related. States with strong capacity are likely to both prepare and respond better to natural disasters than those with weak capacity. Leaders must

best decide how to allocate scarce resources toward both preparation and response, and leaders accountable to a large constituency are more likely than leaders with a small coalition of supporters to invest in public preventative measures.

Countries with strong state capacity to respond to these problems tend to protect property rights, heed the demands of their constituency, have sophisticated domestic disaster management plans as well as formal means of providing immediate humanitarian assistance and long-term compensation through legitimate legal, social and political channels. These countries tend to be proactive in their approaches to addressing natural disasters by investing in public infrastructure like levees, bridges, dams, irrigation and canals, as well as providing safety nets like governmentally-supported crop insurance. Countries with strong state capacity tend to be institutionally robust and politically accountable, highly responsive and flexible in their ability to absorb exogenous shocks.

Countries with weak state capacity, on the other hand, tend to lack these responsive institutional instruments. Countries characterized by corruption and lack of political accountability, an unskilled or partisan military, commodity-driven economies and underinvestment in public infrastructure have fewer adequate resources for responding to climate-related natural disasters. They also have a lesser incentive to make long-term investments in the public infrastructure sphere which might help to mitigate some of the negative consequences of natural disasters. Governments of this variety tend to appeal to international humanitarian agencies and individual donor

countries for both emergency and ongoing monetary and agricultural assistance. While countries with strong state capacity can effectively manage climate-related externalities independently, countries with weak state capacity often seek external help to subsidize their own shortcomings.

Some governments have the economic power to absorb the shock of natural disasters, and others do not (Miguel *et al.*, 2004). Economic power describes the size of the economy and its diversity. States with substantial manufacturing capacity, skilled workers and robust trade will be better able to respond to natural disasters with their own resources, relative to those states with smaller economies dependent on primary commodities. Alternately, states may seek help from allies, neighbors or the international community, essentially “borrowing” capacity from the help of international institutions or sympathetic governments.

The size of the economy matters as states with large economies will be less vulnerable to exogenous weather shocks than smaller economies (Hendrix, 2010). Following the 2008 earthquake in China, several corporations in the United States offered to send tents to people displaced from their homes. While this was a sincere gesture of goodwill, it paled in comparison to China’s domestic response which entailed increasing domestic production and distribution of tents. In other words, China did not need the humanitarian responses offered by other countries and companies, as its own resources were more than sufficient to address its citizens’ needs.

The source of national revenue generation also matters. Natural disasters are public emergencies that require coordination and response *en masse*. To prevent negative social, humanitarian and political consequences, governments can effectively and efficiently respond to natural disasters by allocating public funding to relief efforts and compensation. The central government is the agent which has the authority to provide public benefits to citizens. Most states require some form of popular taxation which, in times of duress, people expect should be used to provide for the common welfare. Taxation explains in part the expectations that people feel toward government assistance following natural disasters. Citizens look for a return on their tax contributions, which the government provides through allocation of public resources to disaster prevention and responses.

Under ideal circumstances, when natural disasters happen, governments would show appropriate stewardship of public resources accumulated through taxation and allocate funding to assist the victims. This could mean compensation for economic losses, assistance with transitional housing or relocation, provision of humanitarian goods like food, water and medical assistance, provision of police or military personnel to maintain and establish security and order and assist with evacuation, if necessary. Good governance related to natural disasters could also mean that governments provide adequate preparation and mitigation against eventual problems, like inoculating against infectious diseases, maintaining adequate medical facilities, building levees and dykes, maintaining public infrastructure like roads and bridges, and helping to coordinate emergency disaster response plans.

States that are unable to economically accommodate the needs created by natural disasters often seek assistance from other states. Humanitarian aid helps states offset the potential negative consequences that leaders and governments face from dissatisfied constituents. However, humanitarian assistance does not guarantee that governments will be insulated from citizen reprisals since relief aid may be distributed unevenly, or pocketed in the coffers of the privileged elite.

In many countries, the military serves as the first responder following natural disasters. Previous scholarship has identified military capabilities as one measure of state capacity. States with a large but poorly trained and compensated military may be more likely to use the military for repression rather than as first responders providing relief. States with a small military may be incapable of responding adequately to humanitarian emergencies following natural disasters.

State capacity is also the degree to which a state can adequately address the demands and problems incurred as a result of natural disasters, and determines the depth, magnitude and duration of the effects of natural disasters. People expect that their government will address their disaster-related problems.

States' strategies for responding to natural disasters vary widely, especially given the variation in the provision of public goods like security, social services, public roads and political support for economic sectors, like agriculture. State capacity

conditions how states handle preparation for natural disasters, coordination problems facing responses to natural disasters, and provision of public goods.

The most salient recent example of a state lacking the capacity to address natural disaster-related problems is the case of Darfur in the Sudan. This issue has received much attention for the social and humanitarian problems created by natural disasters and exacerbated by weak governance. Drought created crop failures, and people migrated in search of food security. Sudan's inability and unwillingness to provide for and respond to natural disasters has drawn the world's attention to the plight of those suffering the conditions of famine, displacement and conflict. States with weak capacity to respond to natural disasters do not have these same strong institutions to guide them.

2.5 Disaster characteristics

The accelerated pace of occurrences of natural disasters is cause for concern, given the rise in population numbers and the increase in the number of people likely to be affected. Not all societies will be able to respond adequately to the challenges posed by increasingly unpredictable weather patterns. No state is immune to the consequences of natural disasters, but some societies are better equipped to cope with their effects. States with larger populations and those experiencing more natural disasters affecting more people may experience diminishing returns with regards to their willingness and ability to respond to these events.

The effects of natural disasters are dependent on individual states' willingness and ability to prepare and respond to them. Yet there is reason to believe that states do not have uniform approaches for dealing with natural disasters. All states are not equally prone to experiencing all types of natural disasters, so it reasons that states rationally expend their scarce resources to prepare for the types of natural disasters they are most likely to experience. The characteristics of natural disaster type matter, since a state's environmental endowments and predisposition to particular disaster events help determine its approaches to dealing with problems associated with them as well.

In this project I evaluate the effects of floods, storms, droughts, extreme temperatures epidemics and earthquakes. These disasters kill and affect the most people annually worldwide, and they account for the majority of natural disasters that occur. These disasters often have interrelated effects: a drought may be caused by extreme temperatures, and floods can precipitate outbreaks of epidemics like dengue fever or cholera. Table 2.2 shows the criteria I used in determining which natural disasters to include.

Natural disasters have important distinguishing features that contribute to the way they affect societies. These include the type, frequency, scope, onset, duration, reach, and location of the disaster. Previous research on the effect of natural disasters on conflict behavior has asked whether natural disasters happen disproportionately to lower-income countries (Davis & Seitz, 1982). As a starting point, this is a logical

Table 2.2. Effects of natural disasters

What kind of natural disaster?	(Type)
How often does it happen?	(Frequency)
How many people are affected?	(Scope)
How quickly does the disaster happen?	(Onset)
How lasting are the effects?	(Duration)
How widely felt are the effects (global, local)?	(Reach)
What economic sectors are affected?	(Sector)
Where is the natural disaster?	(Location)

question, since the political, economic and humanitarian consequences of natural disasters are often more severe in lower-income and developing countries that lack the willingness and/or ability to prepare and respond to them. However, this does not mean that higher-income and developed countries are immune to disasters' ill effects, as seen in the cases of Hurricane Katrina in the United States and the French heat wave of 2003.

Much scholarly work has treated all natural disasters as a set of similar events with little theoretical distinctions between them, even though there is reason to believe that they have important categorical differences (Nel & Righarts, 2008). I examine the effects of the most frequently occurring natural disasters and those that kill and affect the most people. These include floods, droughts, storms, extreme hot and cold temperatures, epidemics and earthquakes. The effects of earthquakes have been examined in terms of conflict propensity, but not in terms of lower-level social conflict, human rights or leadership tenure ³ Distinguishing between the types of natural

³Smith and Flores (forthcoming) examine the effects of natural disasters and governance on the number of people killed, and on the number of protests and demonstrations.

disasters is important because governments' policies vary by disaster types, threats and vulnerabilities (Smith & Quiroz Flores, 2010).

Figure 2.1 shows the number of natural disasters by disaster type between 1950 and 2010, clearly showing an increase in the total number of disasters Em-dat (2010). More disaster events means more expenditures for states in relief and compensation, more affected people, and more opportunities for citizens to evaluate their government's policy performance. The incidence of all natural disasters is on the rise in all categories of disaster events; however, weather events account for the greatest proportion of natural disasters as well as the category with the greatest increase in events. The scientific and policy communities have paid more attention recently to the increase in natural disasters which are projected to increase in frequency and intensity as climate and weather patterns change. Concern for geological natural disasters have not rallied the policy and scientific communities in this same fashion. Because people hold governments accountable for natural disasters, it is important to disentangle whether people are responding to the effects of natural disasters or to their political salience as leaders pay increasing attention to their consequences.

Figure 2.2 shows the number (in thousands) of people affected by natural disasters. The total number affected by natural disasters is a function of several factors: first, there are more people living now than at any other point in human history; second, many millions of people are living in economically, politically and socially vulnerable situations; and third, the number of natural disasters is increasing, as is the intensity

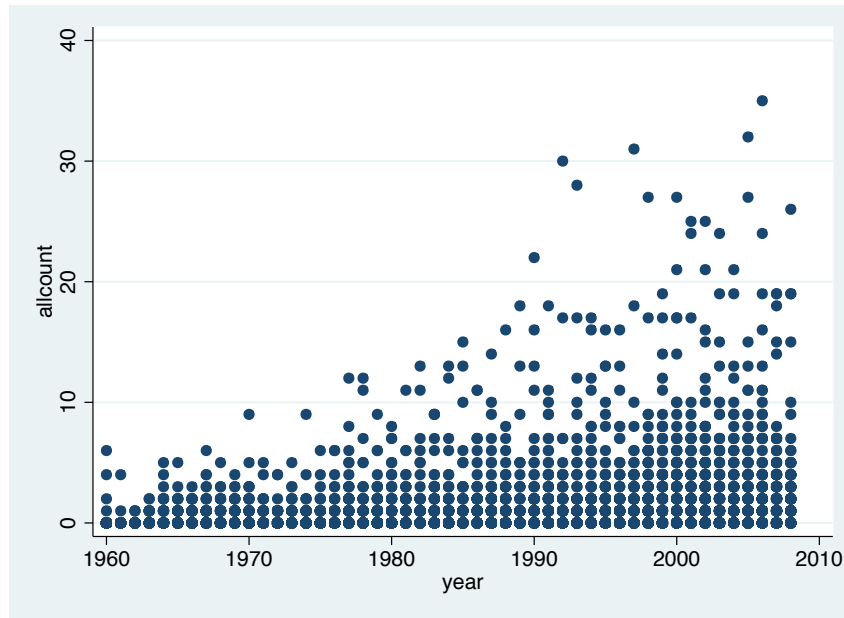


Figure 2.1. All Natural Disasters 1960-2008 (Source: EmDat)

with which they occur. As more people are affected by the humanitarian elements of natural disasters, problems of hunger, access to clean water, physical displacement and security become more important. Governments are accountable to an increasing number of people who demand their efforts in providing relief and compensation from natural disasters. More people affected translates to more demand on government resources.

While all natural disasters have humanitarian, social and political impacts, the natural disasters - that occur most frequently and affect the most people have the largest impact on political processes. More demand on government resources as costs and casualties from natural disasters accumulate may mean that governments become less willing and able to provide disaster prevention and response measures.

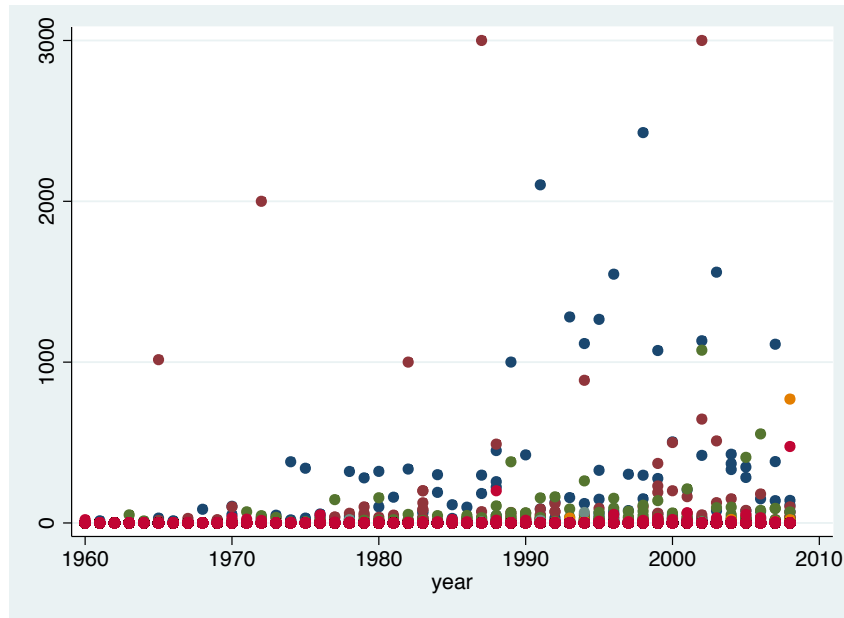


Figure 2.2. Total number of people affected by natural disasters in 100,000s, 1960-2008 (Source: EmDat)

Vulnerability and threats to specific populations

There are also within-country differences in disaster preparation and responses, evident in the case of Hurricanes Katrina where local, state and federal agencies were criticized for failing to prepare and intervene effectively. States that are less willing and able to address the consequences of natural disasters may also have other pre-existing problems, like income inequality, poverty, a history of conflict, or aggrieved minority populations which can threaten specific populations.

To address threats to both general and specific populations, states' natural disaster policies can include humanitarian programs of vaccinations to inoculate citizens

against preventable diseases, and maintaining a sufficient medical infrastructure. They can also include public works like paved roads, levees and dams, emergency warning systems, and maintaining professionalized militaries for responding to disaster zones. Using the example of Hurricane Katrina, we can see that even while the United States is both willing and able to prepare for and respond to natural disasters, much of the population affected by this event had pre-existing vulnerabilities which made its effects more calamitous. In spite of clear predictions about the storm's intensity and trajectory, many citizens in the path of Hurricane Katrina were unable to evacuate. Those trapped in their homes and within the disaster zone faced many months of chaos and disorder. Hurricane Katrina exposed inter-agency coordination problems, and showed Thus the number of people killed and affected by the various types of natural disasters can indicate both the severity of the event, and the size of the threatened population.

Depending on the type of government and the capacity to address existing vulnerabilities and those made more exigent by threats posed by natural disasters, people can expect varying levels of preventive and palliative policies. People in poverty often require more services and intervention because they lack the resources to buffer the costs of the natural disaster on their own. Poverty on an international level is a relative concept; the baseline for poverty in Bangladesh is different from poverty in Canada. However, across countries people in poverty do tend to spend more on food and housing and face more threats than citizens with more resources. Poverty also creates more vulnerability to natural disaster shocks that increase the prices of basic

needs like food and housing. Natural disasters are likely to affect people in poverty as well as people working in the agricultural sector, which are often overlapping groups.

Natural disasters happen in every country, and the variation in their effects is related to the individual state's willingness and ability to cope with the consequences. It is also evident that a storm or earthquake will affect Haiti differently than it will the United States because there are important economic, political and humanitarian response differences between those two countries. More people are affected and killed in countries with higher poverty rates, less investment in preventive infrastructure, and fewer resources to respond. Natural disasters can have cascading effects, meaning that one disaster can precipitate another. Floods can spur insect infestations and epidemics. Extreme temperatures can lead to droughts. Citizens, especially minority groups and those in poverty, can be multiply vulnerable to several natural disasters simultaneously.

Effects on agriculture

Having an economy dependent on agriculture makes a country particularly susceptible to the deleterious effects of natural disasters, since many natural disasters affect countries' production capacity. The sophistication and diversity of a country's economic portfolio is a function of state capacity, as agriculture is the bellwether for gauging the impact of natural disasters. Countries reliant on subsistence agriculture, on primary commodity exports, or on grain imports or subsidies are particularly vulnerable to negative consequences of natural disasters. This is in part due to a high

correlation between countries with agricultural primary commodities and high rates of poverty, which makes them especially vulnerable to natural disasters. Countries with inadequate agricultural infrastructure, like machinery or storage facilities, are also similarly vulnerable. Interestingly, these countries are not only vulnerable to natural disasters that happen within their own borders, but also to natural disasters which happen in the international system which affect the production and supply of agricultural products.

Natural disasters also have the potential to affect the agricultural sector in multiple ways. Droughts, floods, insect infestations, storms and extreme hot and cold temperatures all have the potential to destroy crops. When crops are destroyed, food prices often increase, and rising prices are unequally felt across societies. This is especially true for vulnerable societies, like those with high poverty rates and weak political institutions. Natural disasters that affect agriculture and crop production may affect political processes that extend beyond the border of the country in which they occur. In other words, local natural disasters may have global effects. The globalization of food production and distribution has made disparate economies dependent on each other. Global exports and imports of grain can make societies vulnerable to natural disasters happening throughout the world. While local natural disasters are likely to have the greatest effect on political processes, we cannot discount the effect of natural disasters that happen worldwide, especially those that interrupt the production and distribution of basic food commodities.

The narrative from the long-cycles literature demonstrates that cooling temperature curtailed agricultural production and depleted grain storages. Societies' success in adapting to the challenges of natural disasters lies in how they regulate their food systems. The role of agriculture in the two long-trend studies cannot be understated: agriculture is the conduit between climate and weather patterns and human behavior. Many developing countries are still reliant on subsistence agriculture, however, while the developed countries export their bumper crops to global markets. Zhang *et al.* (2007b) describe the process as follows:

“When agricultural production went down, wheat prices went up in both Europe and China. When prices reached a certain level, more wars erupted. Population growth rates were influenced by both war frequency and food supply per capita (reflected in cereal prices) and dramatically dropped to negative values when agricultural production was at its lowest levels, cereal prices reached their highest level, and peaks in war frequency occurred.”

Access to food and water, determined by seasonal planting and harvesting cycles, is paramount to human survival. These cycles are sensitive to variations in temperatures, rainfall, and soil quality. While structures like homes and public buildings can be rebuilt relatively quickly, destroying a season of crops can have years-long effects that can be felt throughout the country and throughout the world, not just in the location experiencing the disaster. As in the past, the interruption of agricultural production, whether due to mismanagement of natural resources or by changes in the weather and climate, affects people and societies. In pre-modern society, when agricultural resources were depleted, societies either became extinct or people moved on to greener pastures. While not everyone in society is a producer of agricultural

products, everyone is a consumer. Inasmuch as natural disasters disrupt the supply of basic necessities, they create a context for political grievances and assessing government performance.

In 1977, Canada suffered a drought that cost the country upwards of \$100 million in extra power generation costs, \$20 million in unanticipated fire mitigation efforts, and \$10 million in emergency federal and provincial drought relief programs. In 2001, it experienced another drought costing \$4 billion dollars. However, neither of these events were “characterized by catastrophic injury or death (Khandekar, 2004).” Canada was able and willing to undertake these efforts because of existing measures similar to the federal crop insurance programs enacted as a part of the New Deal in the United States after the 1930s Dust Bowl. Natural disasters that occur in the world’s breadbasket countries may not result in a tremendous loss of life in those countries in which they occur, but they can have international ramifications for countries that rely on their crop production as food imports.

Today famines and undernourishment plague many societies. People still migrate and immigrate, both willingly and forcibly, in search of food security as well. Some of these coping mechanisms have survived, while others have evolved with the development of modern forms of government and social institutions. People make demands of their government to help offset the burden of adaptation to food availability and cost. While governments are not held accountable for the natural disasters themselves, they are, however, viewed as arbiters of the economic climate. When food

prices increase, governments can offer price supports for basic food goods, and control the amount of food imported and exported to accommodate the needs of citizens and prevent or quell unrest. They can invest in public infrastructure like roads to transport goods, and irrigation that makes land more fertile and productive. Governments can protect private property to help both farmers and consumers cope with natural disasters.

African exceptionalism

A prominent specialization within recent scholarship on climate change and social problems is the examination of how these processes are affecting Sub-Saharan Africa, and their likelihood on the incidence of civil wars. Many scholars have been singularly focused on the deleterious consequences of climate change in the Sahel, like the effects on African crops (Burke *et al.*, 2009b; Miller *et al.*, 2011), and the risk of civil war (Burke *et al.*, 2009a; Raleigh, 2010; Buhaug, 2010; Hendrix & Salehyan, 2010). In spite of overwhelming evidence that natural disasters are a global, not regional problem, much scholarship still continues to focus on Africa. As previously mentioned, the government, climate and conflict in the Sudan has led some scholars to call the confluence of problems the world's first modern climate war. In some ways, the conflict in Darfur exemplifies the standard story of the relationship between climate and conflict, whereby resource competition as a function of degradation and scarcity creates or exacerbates grievances between groups in society, thereby inciting violent conflict. The violent conflict, in turn, damages the environment as a casualty of war as well as poor institutional governance and management. As an African

nation, it is emblematic of the focus of most recent scholarship on the relationship between environment and conflict on the African continent.

In some sense, Darfur has served as the archetypical scenario for the social, political and humanitarian problems associated with climate change and natural disasters. This scenario of privilege and power, drought and famine, ethnic tension, and civil war has led researchers to conceive of all climate problems in this fashion. Darfur has been the model for analyzing the effects of natural disasters on society. This analysis has yielded wildly divergent findings that encourage some scholars to claim a strong significant effect of climate on conflict, and others to find a weak or inconclusive relationship. Many intractable problems are found in Africa, from poor governance to ethnic conflict to civil war to economic stagnation to disease and famine. The world pays great attention to the problems facing Africa, and provides substantial funding and humanitarian aid to countries located on that continent.

There are several reasons why focusing on Africa may not help us understand the full range of effects that all countries throughout the world may experience. First, social problems like civil wars, domestic conflicts are overrepresented on the African continent. Second, African states are remarkably homogenous in terms of post-colonial leadership styles and non-democratic regime types. Finally, the region is prone to exceptionally fragile environmental conditions because of the terrain and climate, as well as widespread underdevelopment and poverty, and many countries are reliant on foreign aid and assistance. The commonality of Africa's problems of inadequate in-

frastructure and undiversified economies beyond agricultural subsistence, oil wealth and the diamond industry, limit scope of our inferences since these conditions are not representative of governments around the globe. For these reasons, we must take a global perspective on natural disasters to be able to make generalizable claims about their consequences.

In the subsequent sections I discuss the ways in which natural disasters, conditioned on states' willingness and ability to cope with them, affect various political processes including social conflict, leadership duration and human rights.

2.6 Dependent variables

Social conflict

Natural disasters can exacerbate existing and create new grievances in society. The degree of income inequality and dispersion of wealth, political efficacy and power, and protection of minority rights and representation may affect the propensity for conflict or contentious behavior. Natural disasters, as previously mentioned, are threat multipliers in that they create a tipping point for social and political behavior. When natural disasters happen, they highlight political and institutional weaknesses and provide the opportunity for aggrieved citizens to articulate their grievances. One way citizens can demonstrate their frustration with government response, or lack thereof, is through protests or other forms of publicly contentious behavior.

Natural disasters can exacerbate pre-existing problems and provoke previously established grievances. In this sense, they serve as threat multipliers for already vulnerable

populations, like those in poverty as well as political, ethnic and/or religious minorities. While cross-nationally poverty is a relative concept, the notion that people living in poverty are more vulnerable to natural disasters is not. Natural disasters exacerbate existing and create new grievances. They create unequal consequences in society, identify political and institutional weaknesses, provide opportunities for articulating grievances as well as incentives to reward or punish leaders for their disaster responses, and they provide opportunities for exhibiting contentious behavior.

Most existing literature focuses heavily on civil war as an outcome following natural disasters, particularly those related to climate, weather and earthquakes. Researchers and policymakers have expressed tremendous interest in understanding the determinants of civil wars, since they tend to be economically, politically and socially very costly. However, civil wars are still relatively rare events, and investigating lower-level contentious behavior will help to fill in a gap in existing conflict processes theory. To look at the effects of natural disasters solely through the experience of civil war is to limit our potential findings, since many interesting political phenomena related to natural disasters may not meet the threshold definition of civil wars.

A more likely scenario than civil war is lower-level social disturbances like demonstrations, protests and riots happen more frequently. Sub-national contentious behavior is a more likely outcome than civil wars, and is yet an under-explored area of research. People and governments in both poor and wealthy countries are often unprepared

for the range of events, including protests, that follow natural disasters. Discontent is a likely outcome when people are displaced, when security is tenuous, when domestic institutions insufficiently absorb the weather shocks, and when people deem the government response unsatisfactory.

Both civil wars and contentious behavior require actors to overcome collective action problems. Participation in public demonstrations, protests or riots requires coordination between participants, but this coordination is fundamentally different from that required to mount and sustain a civil war which requires access to weapons and a long-term strategy for fighting. The ultimate goals differ between civil wars and more general contentious behavior, where the former may seek a complete overturn of the current government and the latter may seek redress of specific grievances or attention to particular disaster-related policies. While civil wars seek a change of government, protests, demonstrations and riots are more likely seeking a change of policies within the existing government.

Given the differences between the goals of combatants in a civil war and those of people participating in protests and demonstrations, scholars make a giant theoretical leap in stating that natural disasters provoke civil wars. All states experience natural disasters, but few states experience civil wars. This presents a curious problem: why do all states not experience civil wars following natural disasters? One explanation is that researchers are looking at the wrong phenomenon, since many states do experience disruptive protests, demonstrations and riots. It is possible to

disaggregate the question further by asking if all natural disasters lead to contentious behavior, or if some are more aggravating than others? Conservatively, we can say that we have much to learn about the social and political effects of natural disasters given their many forms and outcomes.

It is logical to question under what circumstances people would participate in protests, demonstrations or riots as a result of natural disasters. In some states, protest may be ritualized and protected as part of fundamental freedoms, i.e. expression and assembly. Protest may be used gain media attention, to forge alliances within society and demonstrate solidarity with affected citizens, to elucidate grievances against the current party in power, to engage government leaders in dialogue, and to mobilize and energize voters during elections. Conversely, other forms of protest, like riots, may happen when government institutions are unresponsive not only in providing disaster assistance, but for holding leaders and officials accountable for their shortcomings. Thus protest can be both ritualized or destabilizing, depending on the institutional context, the group affected, and the number of people affected by the natural disaster.

It is important to understand the function of contentious behavior following natural disasters as distinct from civil wars because in most cases, the grievances do not lead to civil wars and are resolved by other means. For example, governments can accede to the protesters' demands, and the protesters can find relief through electoral and judiciary institutions. Conversely, governments can ignore the protests, or they can use repressive measures to quash them. Individual case studies have identified

the role of changing weather and climate on protest behavior, as in the phenomena of food riots where the cost of food drives mass public demonstrations. However, as a global phenomena, sub-national contentious behavior related to natural disasters is not well understood.

Food, shelter and physical security

Natural disasters create complex humanitarian emergencies. Because people are often displaced from their homes and dispossessed of their belongings, governments are called upon to help citizens reconstruct their lives from scratch. Citizens can find themselves deprived of basic human rights, like access to food, clean water, and shelter, following natural disasters. Some countries possess sufficient resources to assist citizens in the aftermath of natural disasters, but others lack the necessary infrastructure and supplies to alleviate suffering and help restore order in society. Other states have the ability but lack the will to intervene on behalf of their citizens.

Without proper infrastructure, initial natural disasters like floods can give rise to subsequent natural disasters, like infectious diseases or insect infestations. In Haiti, for example, following the 2010 earthquake the country experience an outbreak of cholera because of insufficient sanitation and basic infrastructure to prevent or halt the spread of the disease. Hurricane storms also exacerbate the sanitation problems facing Haitian society as they, too, destroy structures, create standing pools of water that breed mosquitoes, and contaminate clean water sources with effluent.

Many natural disasters also displace people, which exacerbates the issue of food and water security. Internally displaced persons often lack access to adequate food and clean water, as well as permanent shelter. People also cross borders to escape the aftermath of natural disasters and in search of better provision of basic necessities. Natural disasters create refugees with a tenuous pipeline for basic sustenance. When people are displaced, they are likely to need tremendous assistance from either the state or private groups. They are more likely to consume state resources than contribute to state wealth.

In spite of the well-recognized humanitarian implications of natural disasters, we know relatively little about how they systematically affect access to basic necessities like food, water and housing. Food and water are essential to sustaining life, and these valuable resources can be in short supply following natural disasters. Humans cannot survive without adequate caloric intake and potable water. Natural disasters can deplete and contaminate water supplies, decrease agricultural production, and make food security a paramount issue.

They also create refugees and internally displaced people (IDPs) who require higher levels of support over sustained lengths of time. Refugees are transnationally displaced, while IDPs are displaced within the borders of their own country. Both present complex problems for all types of states, including those who are both willing and able, neither willing nor able, and alternately willing and able.

Beyond basic human rights, natural disasters can also provide opportunities for governments to actively violate citizens' rights through repression and violations of their physical integrity. Whether or not citizens' human rights are actively violated is dependent on state capacity and government type. Davenport (1999) established that democracies are less likely to use repression than are non-democracies, and that democratization also decreases the rate of repression within states. Democracies are better than autocracies at protecting human rights than are autocracies for many reasons, including regular, free and fair elections, a strong rule of law, redress of grievances through formal legal channels, and a broad base of citizen support and participation for these institutions (Fein, 1995; Davenport, 1999; Cingranelli & Richards, 1999; Davenport *et al.*, 2004; Richards & Gelleny, 2007). States may opportunistically resort to repression following natural disasters, especially if those affected are seeking relief by engaging in contentious behavior like protests or demonstrations.

Fates of leaders

All natural disasters are a problem for governments because citizens expect that governments will provide relief, compensation and redress for their effects. Natural disasters are fundamentally unique from other economic or political shocks: economic and political policies reflect specific, deliberate government policies for which citizens rightfully and logically can hold their leaders accountable. For example, if leaders initiate an unpopular war, they may suffer the consequences politically, especially if the war effort is unsuccessful. If leaders enact economic policies that foster inflation and unemployment, they may also be held similarly accountable for these

actions. While governments do not create natural disasters, their policies determine how disasters affect their citizens.

Natural disasters may affect the duration of tenure in office, and the means by which power is removed. People both reward and punish leaders for policy performance, and leaders who perform poorly are likely to be removed from office while those who satisfy the public's needs should be rewarded with longer tenure within the political and institutional bounds of that particular society. People hold leaders accountable for their policy actions. They reward favorable policies with longer tenure and punish leaders for unpopular policies by removing them from office. The mechanisms for removing leaders from office differ by government type. Autocratic leaders generally hold power much longer than leaders of democracies whose terms are limited by institutional constraints.

An essential element of adequate natural disaster policy is responding in a timely matter. Ideally, governments will respond quickly to the problems created by natural disasters. The type of natural disaster may help to characterize the speed of government response. Disasters that happen quickly are likely to create clear expectations of need, including the type of assistance that governments should provide. Other disasters that have a slower onset, like droughts, may encourage governments to delay their responses. From the government's perspective, this is a rational decision, given that in normal years, there is an expected amount of rainfall and that the current conditions are an anomaly. Rather than invest scarce resources in a disaster that

they believe will likely resolve itself in the next season or next year, governments will be more likely to withhold resources pending a natural resolution to the problem.

2.7 Expectations

Given states' varying willingness and abilities to respond to natural disasters, we can expect different outcomes across societies. Democracies should be more willing to respond to natural disasters based on the size of the constituency to whom they are accountable, and given the regularity of elections whereby they may be removed from office if their constituents blame them for ineffective or inefficient responses. Other literature has shown that in democratic states like the United States and Germany, citizens reward their leaders for favorable post-disaster policy performance and punish them for poor performance (Healy & Malhotra, 2009; Achen *et al.*, 2004; Bechtel & Hainmueller, 2011). Even though leaders in democracies are not rewarded for disaster prevention to the same degree as they are for disaster response, democracies should be better than autocracies at providing public goods like roads, security, health care and human services that mitigate the deleterious effects of natural disasters.

Autocracies, on the other hand, should be less willing to prepare for or respond to natural disasters because their tenure in office is dependent on a comparatively small constituency. Because they remain in office by providing private goods to a small group of supporters, leaders of autocracies have a disincentive to prepare for or respond to their citizens' needs following natural disasters because they do not require their support for extended time in office.

In addition to willingness, states responses to natural disasters are also conditioned on their capacity to respond. States' ability is distinct from willingness in that states with sufficient economic power, or a budget sufficiently allocated for disaster prevention and mitigation, may not require political will to address the problems created by natural disasters, as seen in the case of China or primary resource-rich countries like the United Arab Emirates. However, just because a state is theoretically able to respond, does not mean that they will. Political will is theoretically more important than a state's ability to respond, as demonstrated in the case of Singapore.

Varying levels of willingness and ability create different vulnerabilities for states. First, leaders can be vulnerable to removal from office. Leaders of states that are both willing and able should theoretically be rewarded with extended tenure in office, and leaders of states that are neither willing nor able should theoretically be removed from office. Leaders of states with more natural disasters and more people killed and affected by them are more vulnerable than leaders with fewer disasters and fewer citizens affected.

Second, countries can be vulnerable to social unrest if citizens' needs are unmet following natural disasters. Natural disasters have created opportunities for events like food riots that can be either formulaic and procedural protest events, or they can be destabilizing and threatening to the establishment (Tilly, 1983). Countries experiencing more natural disasters and which have more people affected by natural

disasters should be more likely to experience heightened levels of protest behavior. Since public assembly and protest are often constitutionally protected events in democracies, we should expect to see some contentious behavior, but substantially less than in non-democratic countries which often lack supplemental institutionalized elections and legitimate means of evaluation.

Finally, people living in countries that are neither willing nor able to address problems created by natural disasters should be theoretically most vulnerable to violations of their basic human rights to food and shelter, and also to violations of higher-order civil rights like freedom from oppression. However, even countries which are both willing and able are not immune to human rights violations as the frequency of disasters and the number affected by them increase.

As the number of natural disasters and those affected by them increase, states' ability and willingness to prepare for and respond to them decreases. States face shortages of resources to mitigate disasters the more frequently they occur. Natural disasters that happen within the international system can have negative consequences on individual countries; in other words the disaster need not happen in within the country's own borders for its effects to be felt. The globalization of disaster effects has kept pace with the globalization of commodities trading and increase mutual interdependence between nations.

2.8 Conclusion

This chapter describes a theory of how natural disasters affect political processes given states' varying willingness and abilities. Natural disasters disrupt the status quo and create humanitarian emergencies. People look to their government to respond when this happens, and they evaluate their government's responses. Governments' responses vary according to their willingness and ability to prepare for and respond to natural disasters. Willingness is determined by government type, and ability is determined by state capacity.

Governments do not cause natural disasters, but they are held accountable for their effects and the degree of public support in their aftermath. They do not determine whether or when the rain falls, nor in what quantity. Governments do not make rivers surpass their normal levels, or direct the paths of hurricanes, storms or tornadoes. However, governments are held accountable by their citizens for the policy decisions they make in preparation for and in the aftermath of natural disasters. Governments prioritize policies and allocate funding for the public infrastructure necessary to cope with unpredictable natural disaster events (Cohen & Werker, 2008).

While all states could experience a drought, for example, only those without adequate irrigation, drought-resistant seeds, or adequate food reserves in storage will be likely to feel negative consequences from the lack of rain. Governments do not control natural disasters, but they can provide adequate safety nets to feed their hungry people, stabilize prices, and mitigate the amount of damage to homes, businesses

and agriculture. In essence, it is not so much whether natural disasters happen, but where they happen.

Natural disasters make states vulnerable in several ways: at the level of the state, the leader, and the citizens. They can influence contentious behavior and social conflict, and affect the basic human rights and physical integrity of citizens. Leaders, as the key policymakers for states, are punished or rewarded for disaster responses. Natural disasters are not all of one type; rather, some affect more people and happen more frequently and as such, are more problematic for states.

Contentious behavior in states with weak capacity can have vastly different consequences than in states with strong capacity, especially in a state lacking formal legal and electoral means for redress of grievances. Natural disasters have vastly different implications for states with weak rules for regular transfer of leadership and power. Natural disasters are threat amplifiers for states with weak capacity to respond to exogenous economic or political shocks.

Civil war scholars have led the charge in studying the political consequences of natural disasters, honing in on Africa as the epicenter of problems. Yet there is reason to believe that there are other equally important global phenomena in addition to civil war to understand. This includes understanding how natural disasters impact the duration of leaders in office, the effects on human rights, and the presence of lower-level social conflict and contentious behavior. Given the increase in the num-

ber of natural disasters as well as those affected, natural disaster-related political consequences are important to investigate, as they create and exacerbate grievances and vulnerabilities.

In the subsequent chapters, I empirically evaluate the effects of natural disasters on the tenure of leaders in office, on human rights practices, and on contentious behavior.

Chapter 3

LEADERSHIP TENURE

3.1 Leadership tenure and natural disasters

As we learned in Chapter 2, governments are varyingly willing and able to prepare for and respond to natural disasters. This chapter empirically evaluates this relationship between government willingness and ability and the tenure of leaders in office by asking the question, do natural disasters affect how long leaders remain in office? In country-specific literature, other scholars have demonstrated that leaders are rewarded for favorable policy responses and punished for inadequate responses (Achen *et al.*, 2004; Bechtel & Hainmueller, 2011; Healy & Malhotra, 2009; Zhang *et al.*, 2007a,b).

However, the fates of leaders and regimes when natural disasters happen is underdeveloped in the literature.¹ We can draw on the existing literature examining the effects of economic shocks and crises, which may have natural disasters as their point of origin. It is well-known that citizens punish and reward their leaders for the country's economic performance, but what portion of their votes is attributable

¹Smith and Flores (forthcoming) examine the effects of natural disasters and governance on the number of people killed, and on the number of protests and demonstrations.

to natural disasters? By identifying effects of natural disasters, we may be able to learn more about what makes leaders and governments both vulnerable and stable.

While governments do not cause natural disasters, they are held accountable for their effects and the degree of public support in their aftermath. They do not determine whether or when the rain falls, nor in what quantity. Governments do not make rivers surpass their normal levels, or direct the paths of hurricanes, storms or tornadoes. However, governments are held accountable by their citizens for the policy decisions they make in preparation for and in the aftermath of natural disasters. Leaders choose to prioritize policies and allocate funding for the public infrastructure necessary to cope with unpredictable natural disaster events. Governments do not control natural disasters, but they can provide adequate safety nets to feed their hungry people, stabilize prices, and mitigate the amount of damage to homes, businesses and agriculture. Natural disasters happen everywhere, but the extent of their damage is conditioned on the type of society in which they occur.

All natural disasters are a problem for governments because citizens expect that governments will provide relief, compensation and redress for their effects. Natural disasters are fundamentally unique from other economic or political shocks: economic and political policies reflect specific, deliberate government policies for which citizens rightfully and logically can hold their leaders accountable. For example, if leaders initiate an unpopular war, they may suffer the consequences politically, especially if the war effort is unsuccessful. If leaders enact economic policies that foster

inflation and unemployment, they may also be held similarly accountable for these actions. While governments do not create natural disasters, their policies determine how disasters affect their citizens.

Hypothesis 1: Increases in natural disasters reduce the time of leaders in office.

Natural disasters affect the duration of leaders' tenure in office. Political institutions, dependent on government type, condition the ways in which leaders are removed from office. People both reward and punish leaders for policy performance, and leaders who perform poorly are likely to be removed from office while those who satisfy the public's needs should be rewarded with longer tenure within the political and institutional bounds of that particular society. People hold leaders accountable for their policy actions. They reward favorable policies with longer tenure and punish leaders for unpopular policies by removing them from office. The mechanisms for removing leaders from office differ by government type. For democracies, regular removal from office often transpires through predetermined elections held at predictable intervals. For autocracies, regular removal entails designation of a successor or according to hereditary lineage. Irregular means of removal include acts which contravene established procedures "explicit rules and established conventions," including coups, revolutions and assassinations (Goemans *et al.*, 2009). Autocratic leaders generally hold power much longer than leaders of democracies whose terms are limited by more rigorous institutional constraints.

Hypothesis 2: Increases in natural disasters increase time in office for leaders of countries that are most willing and able.

It is possible that governments pursue different strategies for different types of natural disasters. Given that not all disasters are alike, governments are likely to pursue rational policies which depend in part on their factor endowments, geography, system of governance and future expectations. Natural disasters that happen quickly require a timely response, whereas natural disasters that evolve slowly over time may provide governments the ability to delay their response.

The affected sector of society and populations also may help determine the quickness and thoroughness of government response. Natural disasters that affect a portion of the population that the leadership relies upon for support and tenure can likely expect a more swift and thorough response than those groups not essential for maintaining leadership tenure.

Governments can respond to natural disasters in several ways: through incident-appropriate policy choices; through a delayed response; with no response at all; by blaming the incumbent leader or opposition political group; and by blaming the public. Under ideal circumstances, when natural disasters happen, governments would show appropriate stewardship of public resources and allocate funding to assist the victims. This could mean compensation for economic losses, assistance with transitional housing or relocation, provision of humanitarian goods like food, water and

medical assistance, provision of police or military personnel to maintain and establish security and order and assist with evacuation, if necessary. Good governance related to natural disasters could also mean that governments provide adequate preparation and mitigation against eventual problems, like building levees and dykes, maintaining public infrastructure like roads and bridges, and helping to coordinate emergency disaster response plans.

Ideally, governments will respond quickly to the problems created by natural disasters. The type of natural disaster may help to characterize the speed of government response. Disasters that happen quickly are likely to create clear expectations of need, including the type of assistance that governments should provide. Other disasters that have a slower onset, like droughts, may encourage governments to delay their responses. From the government's perspective, this is a rational decision, given that in normal years, there is an expected amount of rainfall and that the current conditions are an anomaly. Rather than invest scarce resources in a disaster that they believe will likely resolve itself in the next season or next year, governments will be more likely to withhold resources pending a natural resolution to the problem.

Governments also may delay preventative measures to thwart future problems related to natural disasters because the expected gain on returns in public infrastructure are not strong enough (Achen *et al.*, 2004). With regard to disaster preparation, an ounce of prevention is not always worth a pound of cure. Initial research on disaster preparedness indicates that while preventive measures are cost-effective, they are ranked

low amongst constituent priorities. On the other hand, post-hoc expenditures are regarded as very important and help citizens evaluate their leaders policy performance.

Governments may choose not to respond at all to natural disasters for the same expected utility reasons. If the disaster happens to a constituent group not essential to their tenure in office or in power, they may lack an incentive to respond at all. If natural disasters help to displace, marginalize or disempower an opposition group, the government in power could justify a null response. A government may also choose not to respond because they do not have the requisite resources to address the range of problems.

Leaders may blame their predecessor for failure to adequately prepare for or respond to natural disasters. Opposition parties or factions may blame majority parties for the same reason, as well as to capitalize on political opportunities that natural disasters present. These opportunities include articulating grievances and mobilizing their constituency. Most interestingly, governments also blame their own people for the aftermath of natural disasters.

Hypothesis 3: Increases in natural disasters decrease time in office for leaders that are neither willing nor able.

Hypothesis 4: Increases in natural disasters decrease time in office for leaders that are alternately willing and able.

There are many variables that influence leaders' calculations about their prospects for remaining in power, the number of people affected by the natural disaster, and the type of the natural disaster. There is reason to believe that not all disasters have the same effects on populations and leadership tenure. The intensity, severity, duration and scope of the disasters affect the calculations that leaders and governments make. For this project I focus on the disasters which occur most frequently and affect the greatest numbers of people. These include extreme hot and cold temperatures, droughts, floods, storms, epidemics, and earthquakes.

Previous research on the effect of natural disasters on conflict behavior has asked whether natural disasters happen disproportionately to lower-income countries (Davis & Seitz, 1982). As a starting point, this is a logical question, since much of the focus is on the devastation they create. I argue that natural disasters happen to every country, and that the variation in their effects has to do more so with the country's coping mechanisms than an event count of disasters.

It is evident that a storm will affect Haiti differently than it will the United States because there are important economic, political and humanitarian response differences between those two countries. Figure 3.1 shows the number of people killed and affected by floods, droughts, storms, extreme temperatures, epidemics and earthquakes between 1960 and 2008, the period which I examine in this paper.

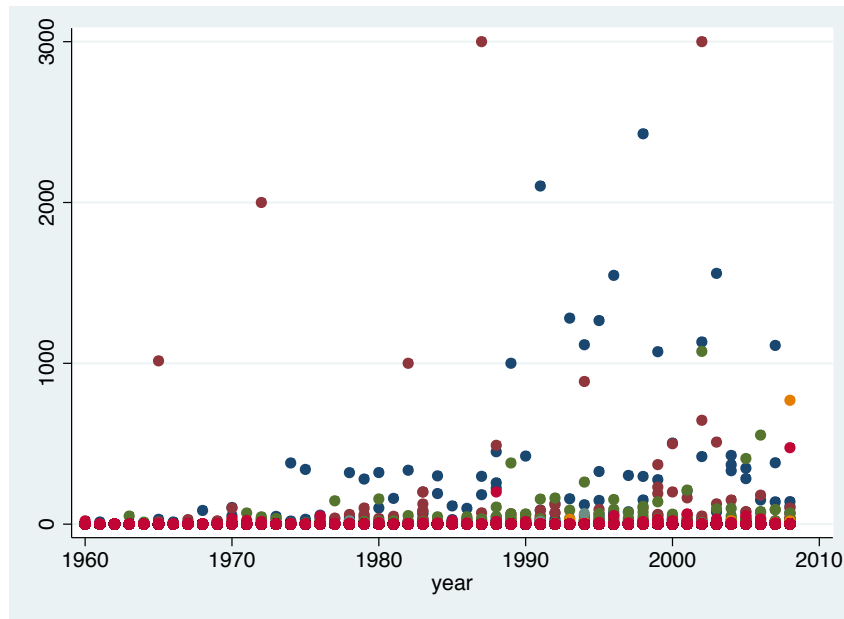


Figure 3.1. Number killed and affected by floods, droughts, storms, extreme hot and cold temperatures, epidemics and earthquakes in 100,000s (Source: Em-Dat, 1960-2008)

Natural disasters can be located in a local and a global context. They can happen within and affect a single state, and can also happen within a single state and affect other states throughout the international system of states. For example, imagine the following scenarios: 1. A country which only experiences a flood, but is able to sufficiently source its population's basic dietary needs because the food system was not interrupted by the flood; 2. A country which experiences no endemic natural disasters, but who is dependent on imports of crops that were affected by natural disasters in other states; 3. A country which is affected both by local and global shocks, experiencing natural disasters within its boundaries and simultaneously affected by the aggregate natural disasters at the global level. Distinguishing between

global and local shocks is substantively important since the presence of either or both can have political, economic and humanitarian consequences.

Hypothesis 5: Increases in global natural disasters decrease time in office for leaders.

Natural disasters are not only temporally relevant, but spatially as well. Droughts, floods, wildfires, extreme temperatures and insect infestations can destroy crops that affect the food supply and prices not only of the country in which they occur, but worldwide. Globalization has increased trading ties between agricultural producers in different states, so when natural disasters happen in countries responsible for production of necessary foodstuffs, other countries are affected as well. This means that local vulnerabilities can have regional or international repercussions for food prices and food security, which itself can provoke a range of potential political consequences.

These political consequences are the effects related especially to the availability and price of food, including protests and demonstrations, forcible removal of leaders from office through coups or revolutions, regime change through elections, and forms of contentious behavior like protests or demonstrations. Recent research on the effects of global temperature increases on agricultural production found that between 1980 and 2008, “(g)lobal maize and wheat production declined by 3.8 and 5.5%, respectively (Lobell *et al.*, 2008).” These decreases in crop production “(t)ranslate into average commodity price increases of 18.9 and 6.4% increases.” Governments have a difficult time planning and preparing for natural disasters and managing their conse-

quences within their own borders; the globalization of food production makes states susceptible to the natural disasters occurring in the international system.

3.2 Data and Methods

The dependent variable for my analysis is the length of time in years that leaders remain in office. Each episode of leadership tenure is recorded with a beginning and ending year, with the final year coded as '1'. I record failure as the year that a leader leaves office. In some years, multiple leaders held office. In this case, I coded that year as belonging to the leader that spent the most time in office during the year. In other words, if a leader left office in March 1950, then that year was coded as belonging to his successor.

For example, Grant (U.S.) left office on March 4, 1877 and was replaced by Hayes who held office for four years. The year 1877 is coded as belonging to Hayes. The year 1876 is tagged as the exit year for Grant and 1877 is tagged as the entry year for Hayes. Similarly, Garfield entered office on March 4, 1881 and exited office on September 19, 1881. Arthur entered office on September 19, 1881 and held office for four years. During 1881, Garfield held office for the longest, so 1881 is coded as belonging to Garfield. The year 1882 is coded as the entry year for Arthur.

If the same leader held office multiple consecutive times, I recorded that as one episode. If the leader enters, leaves and then re-enters office, I code those as separate episodes. The mean length of tenure for the most stable autocracies is 10 years, whereas the mean length of tenure for the most stable autocracies is 4 years.

Natural disaster data comes from The International Database (EM-DAT) at the Centre for the Research on the Epidemiology of Disasters (CRED). CRED follows specific rules for coding missing or unavailable data where zero does not represent a value but rather means that no information is available. Information about disaster events, including the numbers killed and affected, comes from United Nations agencies, governments, the International Federation of Red Cross and Red Crescent Societies, and other various agencies (Em-dat, 2010). The numbers of killed and affected are measured in 100,000s.

I followed the missing data coding scheme instituted by CRED. However, in some cases, EM-DAT data records the incidence of a natural disaster in a given year, but not information about the number affected. In this case, I extend their coding scheme to code the number affected as "0" while retaining the information that indeed a disaster did occur.

To test the effect of natural disasters on leadership tenure, I used the Cox proportional hazards model. My unit of analysis is country-year and I use robust standard errors clustered by country. I test a basic model of natural disasters where the primary explanatory variable includes the total number of people affected by extreme hot and cold temperatures, droughts, storms and floods, standardized by population size.

I generated two dummy variables to capture both the effect of government type and state capacity. Government type is a dichotomous variable generated using the Polity IV dataset. States are coded as ‘1’ if their Polity score is between 6 and 10 in a given year, and 0 otherwise. For state capacity I use the measure of relative political allocation generated by Arbetman-Rabinowitz & Johnson (2007) to generate a dichotomous variable which assigns each country a ‘1’ if their relative political allocation score is greater than the global mean for that year, and a score of ‘0’ if their score falls below the mean.² I generate a three-point scale for each country-year. A country which is neither willing nor able receives a score of ‘0’; a country which is either willing or able receives a score of ‘1’; and a country which is both willing and able receives a score of ‘2’. The ‘0’ category is the default category in the statistical estimation.

Table 3.1. Sample observations for Willingness and Ability

Willing	Able	
	0	1
0	1,645 (26%)	2,358 (38%)
1	1,050 (17%)	1,233 (19%)

Table 3.1 shows the descriptive statistics for Willingness and Ability for states in the sample. Table 3.2 shows the descriptive statistics for the natural disaster variables included in the model.

²Kugler et al include in their measure of relative political allocation information about states’ general public spending, defense, public ordering, economic affairs, housing, health, education and social protection. Their political allocation scale is bound between 0 and 2.

Table 3.2. Summary statistics for independent variables

Variable	Mean	Std. Dev.	N
Extreme heat and cold	0.117	8.708	7851
Drought	2.491	58.205	7851
Flood	3.844	59.238	7851
Storm	0.983	16.721	7851
Epidemic	0.029	0.815	7851
Earthquake	0.202	6.05	7851
Willing	0.363	0.481	6286
Able	0.601	0.49	7851
Willing +Able	0.934	0.674	6286
Global count of natural disasters	170.209	127.427	7851
Log of population	15.496	1.936	7513

3.3 Statistical estimation

The scale measuring states' willingness and ability are interacted with the natural disaster variables. I also include the log of population size by country as well as a count of global natural disasters, including floods, droughts, storms, extreme temperatures, epidemics, and earthquakes. As is customary, I also include both Willingness and Ability as constituent terms (Brambor *et al.*, 2006). I also test the proportional hazards assumption and find no violations (Box-Steffensmeier *et al.*, 2003).

The sample includes 6,654 observations and 1,184 failures in failure-per-subject data. Table 1 shows the results from the Cox proportional hazards model. Since natural disasters do not occur in isolation from one another, I have included them all in one model.

Table 3.3. Cox duration model for leadership tenure and natural disasters

Variable	Coefficient	(Std. Err.)
Extreme heat and cold	-42.509	(105.948)
Drought	-0.026*	(0.012)
Flood	-0.001 [†]	(0.001)
Storm	0.020**	(0.007)
Epidemic	-5.051 [†]	(2.826)
Earthquake	-0.029	(0.078)
Willing and Able	0.188**	(0.062)
Log of population	0.063*	(0.026)
Global count of events	0.001**	(0.000)
1 (Willing + Able) × (Extreme heat and cold)	42.729	(105.947)
2 (Willing + Able) × (Extreme heat and cold)	42.524	(105.949)
1 (Willing + Able) × (Drought)	0.002	(0.028)
2 (Willing + Able) × (Drought)	0.026*	(0.012)
1 (Willing + Able) × (Flood)	0.002*	(0.001)
2 (Willing + Able) × (Flood)	0.004**	(0.001)
1 (Willing + Able) × (Storm)	-0.016*	(0.007)
2 (Willing + Able) × (Storm)	-0.054**	(0.018)
1 (Willing + Able) × (Epidemic)	4.462	(2.918)
2 (Willing + Able) × (Epidemic)	5.126 [†]	(2.827)
1 (Willing + Able) × (Earthquake)	-0.005	(0.081)
2 (Willing + Able) × (Earthquake)	0.033	(0.078)
N	5305	
Log-likelihood	-5987.829	
$\chi^2_{(21)}$	599.477	

Table 3.3 shows that for countries that are neither willing nor able, droughts, floods and epidemics increase the tenure of leaders in countries that are neither willing nor able. Storms and global natural disasters decrease the tenure of leaders in countries that are neither willing and able, and on those that are alternately willing or able. The variable measuring the global count of events also shows a statistically significant negative effect on the survival of leaders in office.

For states that are alternately willing and able, floods decrease the leader's time in office, while storms increase leader's tenure. For states that are both willing and able, droughts and floods decrease leaders' time in office, while storms increase their time in office.

Figure 3.2 shows that the marginal effects of these natural disasters given states' varying willingness and ability are statistically significant, but small. These graphs show the marginal effects of natural disasters on leadership tenure when countries are neither willing nor able, alternately willing and able, and both willing and able. Each graph shows the effect on leadership tenure if every country in the world held the value of 0, 1 or 2. Several marginal effects just miss significance at the .05 level and are statistically significant at the .1 level. With regards to extreme temperatures, if all countries in the world were alternately willing or able, the effects of extreme temperatures would decrease their tenure in office by 1.10 units. If all countries in the world were both willing and able, floods would reduce leaders tenure in office by .008 units. If all countries in the world were neither willing nor able, storms would

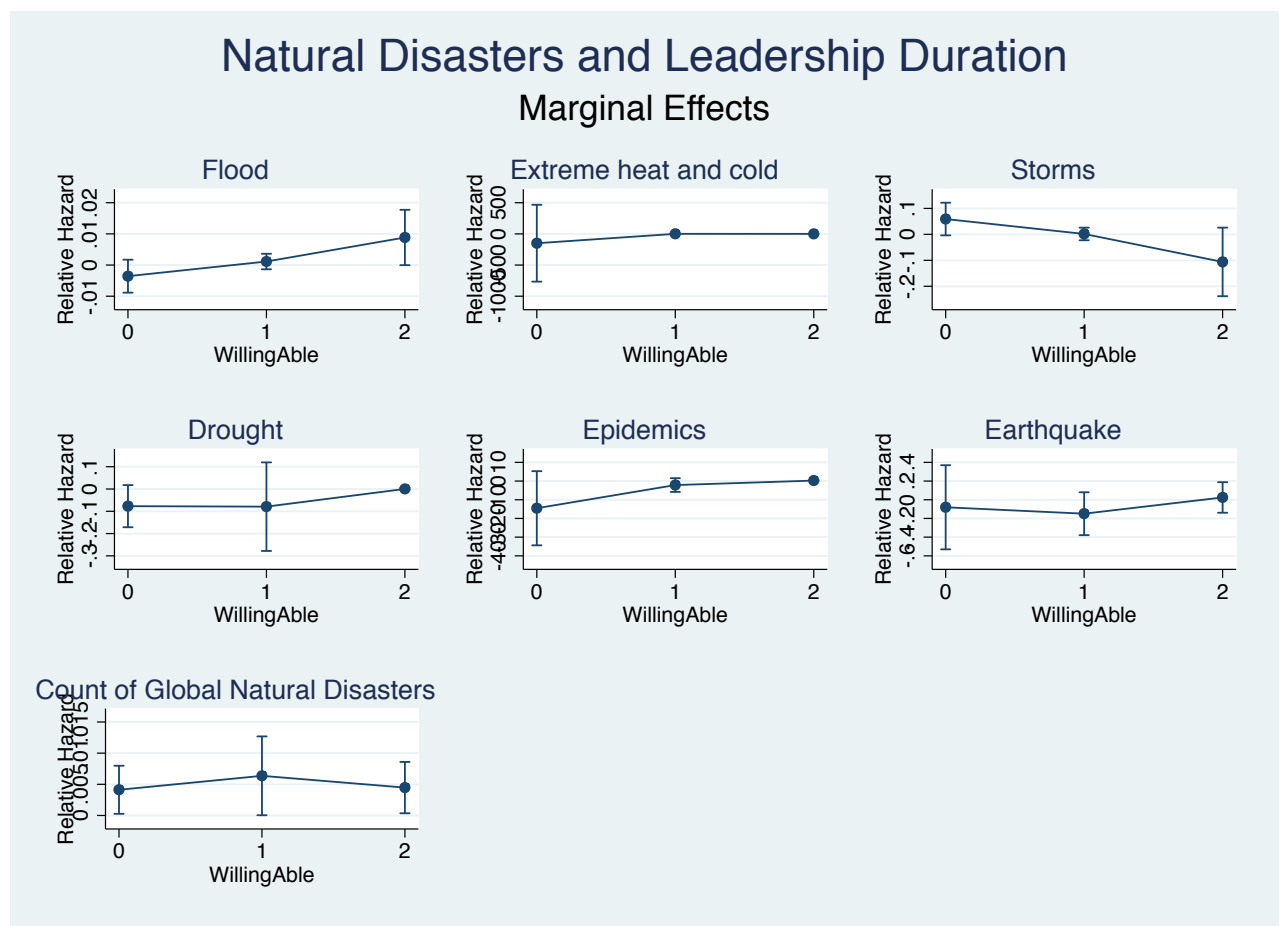


Figure 3.2. Marginal effects of independent variables

decrease leaders tenure by .05 units. The effect of epidemics is statistically significant at the .05 level. If all countries were both willing and able, epidemics would decrease leaders' time in office by .01 units.

The most substantial marginal effects come from the measure of global counts of natural disaster events. More natural disaster events in the system account for a decrease in leadership tenure across the three outcomes and are all statistically significant at the .05 level.

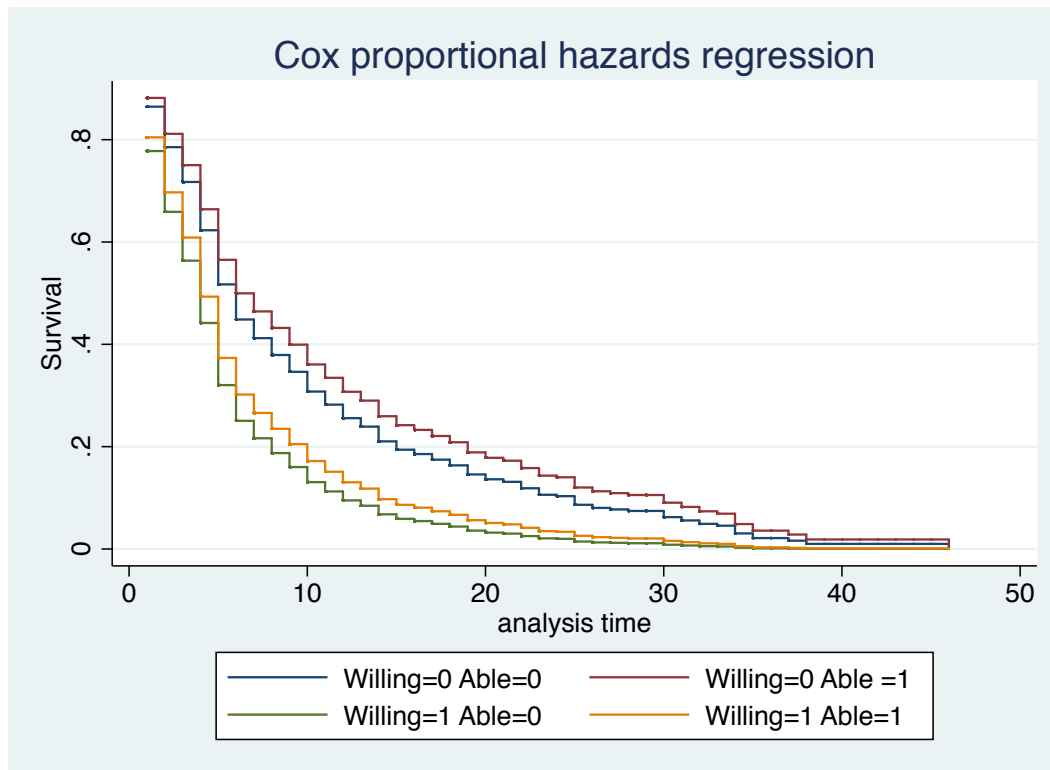


Figure 3.3. Survival time time for leaders by willingness and ability

Figure 3.3 shows the variation in baseline hazard for leaders at varying levels of willingness and ability with covariates held at their means.³ Leaders from countries that are alternately willing and able have both the lowest and highest survival rate in office. Leaders from countries that are both willing and able have a higher hazard rate than those from countries that are neither willing nor able.

3.4 Conclusion and Future Work

Natural disasters affect people, societies, leaders and states. This work demonstrates that the tenure of leaders in office is sensitive to natural disasters, if only modestly. The effect that disaster events have on leadership tenure varies according to states' willingness and ability. States prepare for and address the consequences of natural disasters very differently. This is in part due to the variation in provision of public goods, like roads, levees and dams, and the protection of private property.

Leaders in autocracies and democracies are accountable to constituencies of significantly different size, affecting their willingness to prepare for and respond to natural disasters. States' ability to respond also varies according to their allocation of resources to disaster preparedness and intervention. Previous scholarship has focused primarily on conflict outcomes related to natural disasters, and civil war scholars have provided tremendous insight into the conflict implications of natural disasters. The work presented here extends the conversation beyond conflict to incorporate all leadership transitions in the world system between 1960-2008.

³Future research will show the baseline hazard at other substantive values, i.e. when covariates are held at their minimum and maximum values.

While these effects are modest, they represent a unique first attempt at quantifying the effects natural disasters have on the duration of leaders in office. Future work should disaggregate the middle outcome of ‘1’ where countries are alternately willing and able since there may be theoretically interesting information in each outcome that disappears when added together. There is also modest support for the idea that natural disasters in the international system affect the tenure of individual leaders. As the system is more taxed by the presence of natural disasters, individual leaders may find themselves in increasingly precarious positions with regards to their time in office.

Chapter 4

HUMAN RIGHTS

4.1 Human rights and natural disasters

Protecting the human rights of people affected by natural disasters can be a daunting task for states. When natural disasters like floods or droughts happen, people experience their wrath, losing lives, livelihoods, homes and security. Natural disasters disrupt the status quo, and create social, humanitarian and political needs. Social safety nets that provide formal and informal utility are interrupted and destroyed.

In most cases, people turn to their governments to meet the needs they face. However, governments vary widely in their ability and willingness to provide for their citizens, both in times of disaster and prosperity. Natural disasters create chaos, and government agencies can face coordination problems that prevent them from providing immediate relief and humanitarian assistance to the affected citizens. Often, the most vulnerable members of society are those most affected by and vulnerable to natural disasters - those with the most precarious housing, fragile food supply and tenuous financial safety nets.

Natural disasters stretch the institutional capacity of states and localities. States that already struggle to protect human rights under normal circumstances may have even greater difficulty doing so under the increased social, economic and political pressure resulting from natural disasters. Moreover, states that are disinclined to protect human rights may find increased opportunities under the pretext of natural disasters to oppress marginalized populations. In dealing with the effects of natural disasters, governments can select from a range of policy tools and options, and the policy choice depends most on whether the government is democratic or not. Citizens then may evaluate the outcomes of the government's actions in response to their needs arising from the effects of the natural disaster.

Governments are often pressed to prepare for and respond to natural disasters. No state is immune to the consequences of natural disasters, but some societies are better equipped to cope with their effects. Natural disasters affect all societies, as it has throughout history. The accelerated pace of occurrences of natural disasters is cause for concern, given the rise in human populations and the increase in the number of people likely to be affected. Not all societies will be able to respond adequately to the challenges posed by natural disasters, and states' varying willingness and ability contributes to the humanitarian outcomes that follow disaster events.

In January 2009, the United Nations Human Rights Council issued a report about the effects of climate and natural disasters on human rights (Knox, 2009). The report identifies several key areas where human rights are likely to suffer as a result

of increased climate pressures on civilians within states. These include the right to life, food, water, and housing. The report also identifies several especially vulnerable groups, including women, children and elderly citizens, and religious, ethnic and political minorities. I identify two ways in which states can violate citizens' human rights following natural disasters. First, natural disasters can create food insecurity, depriving citizens of access to adequate nutrition. Second natural disasters destroy structures and homes, and impede access to essential services like emergency shelter. The following examples illustrate the problems of food insecurity and physical displacement.

In 2010, massive flooding during monsoon season inundated the country of Pakistan, displacing more than two million people, placing more than one-fifth of the country under water, destroying more than \$4 billion (usd) of infrastructure and more than \$500 million in crop damage. The humanitarian consequences of the flood have been devastating, sickening more than two million people from food-related illnesses, malaria, diarrhea and snake bites.

Just a few years earlier in August 2006 along the Gulf Coast in the United States, residents braced themselves for the impact of Hurricane Katrina. Some people fled ahead of the storm's impact, relocating briefly to other cities, staying with friends, family and strangers, and still others moved to temporary community shelters, while and some moved away permanently. Under the repressive regime of Kim Jong Il in North Korea, farmers preferred to suffer death under a crippling famine in the 1990s

that reportedly killed more than one million people, rather than lobby the government for assistance (Foster, 2011). The famine was caused in part by severe flooding that destroyed crop storage facilities.

Why, though, should natural disasters give states the opportunity to violate human rights? Natural disasters disrupt the status quo. States' baseline status quo varies depending on the willingness and ability to prepare for and respond to natural disasters. People living in states that are both willing and able should have better human rights outcomes than people living in states that are neither willing nor able or are alternately willing and able. At the most basic level, states violate human rights when this option is less costly than other options, or when they lack the institutional capacity or incentives to protect them.

Davis & Seitz (1982) note that, "While societies generally possess adjustive mechanisms to absorb disturbances that arise within or without their boundaries, disaster situations are so radical that they cannot readily be handled by their usual means." State with the institutional or economic means to absorb the humanitarian, political and social shocks caused by natural disasters are less likely to violate human rights. States lacking the institutional capacity to cope with these shocks are more likely to violate basic human rights.

4.2 Willingness and ability

As defined in Chapter Two, states are varyingly willing and able to prepare for and respond to natural disasters. States that are most willing and able should have the

best humanitarian outcomes since they have the political incentive to address their constituents' needs, and the capacity to meet citizens' needs.

In the case of human rights, states' willingness and ability plays an important role.¹ While democratic states should be more willing than non-democratic states to protect political rights including ensuring protection from repression, all states are likely to be vulnerable to compromising basic human rights following natural disasters. While democracies should be more prepared and better able to intervene following natural disasters, ensuring availability of food and housing can present many problems.

Flexible and responsive domestic institutions allow democracies to weather the effects of natural disasters. Collier & Hoeffler (2005) specifically argue that government type matters to a state's strategy for dealing with resource conflicts through domestic accountability to its constituents. In a democracy, legitimate governance is ratified through widespread political participation, through active and competitive recruitment of the executive officeholder, official term limits, and the presence of open elections. Governments calculate their disaster responses giving consideration to their audience costs. Broad domestic audience costs like those characteristic of democracies dissuade governments from pursuing policies that lead to human rights violations.

¹As previously defined, willingness is defined as a binary concept identifying whether a state is democratic or not with an arbitrary cut point of +6 or higher on the Polity IV scale. Ability is also a binary concept using the Relative Political Allocation measure developed by Kugler et al. A state is defined as "able" if their annual political allocation score is above the global yearly mean.

Mesquita & Siverson (1995), Mesquita *et al.* (2002), Mesquita *et al.* (2003) and Clarke & Stone (2008) describe the composition of governmental coalitions in terms of the selectorate and winning coalition. Bueno de Mesquita explains these terms as follows:

“Nested within the residents of all polities is a selectorate and within that there is a winning coalition. Leaders...maintain their coalitions of supporters by taxing and spending in ways that allocate mixes of public and private goods.”

In democracies, the size of the selectorate is roughly equal to the size of the winning coalition. This means that popular vote installs leaders and removes them from office, and that leaders can earn favor with their constituents by providing public goods to as many citizens as possible. In non-democracies, the winning coalition is much smaller than the selectorate. While many people may have the ability to participate in elections, the leader’s true power is maintained by privileging a small group of supporters with private benefits. In non-democracies, leaders have a disincentive to widely distribute public goods, since their tenure is contingent upon a much smaller subset of individuals.

Governments vary in their provision of public goods. Because leaders of democratic states are accountable to a large constituency, they have an incentive to distribute public goods widely (Boix, 2001). These public goods may take many forms, like investment in infrastructure, social services and security. Security as a public good can be understood as protection from foreign and domestic threats, as well as the

protection of human rights and respect for the basic human rights. Democratic governments have stronger domestic institutions than do non-democracies which encourage the protection of human rights.

4.3 Hypotheses

There are three potential outcomes for states' willingness and ability as they relate to protection of human rights. States can be both willing and able, alternately willing and able, and neither willing nor able to protect human rights. States that are both willing and able have the political mechanisms to ensure that protection is extended to a large proportion of society, i.e. those in the winning coalition, as well as the ability to provide services and resources to their citizens.

States without willingness and ability are likely to have worse human rights outcomes as they lack both the political institutions that ensure protection of human rights and the means to provide them through preventive or compensatory measures. States with either willingness and ability have mixed outcomes, since willingness without ability may mean that human rights could be compromised through passive neglect, or through deliberate denial of protection or provision of services.

One way to measure the protection of basic human rights is through the availability of food and housing. By accounting for the quantity of nutrition measured in kilocalories per person, we can better understand under what conditions natural disasters are likely to deprive people of their right to adequate nutrition.

Natural disasters are likely to affect food security in several ways. First, when disasters happen, they often interrupt the distribution of goods and supplies, destroy road and electrical infrastructure which can cause food to spoil. Natural disasters also can disrupt the production of food when they affect growing cycles and destroy crops. In non-democracies, violations of human rights may be more difficult to identify.

Hypothesis 1: An increase in natural disasters leads to a decrease in the availability of food.

Hypothesis 2: As willingness and ability increase, the deleterious effects of natural disasters on food availability decreases. Conversely, in states that are less willing and able, an increase in natural disasters should have a large negative effect on the availability of food.

Hypothesis 3: An increase in natural disasters in the global system should have a negative effect on the availability of food.

When natural disasters happen, they often destroy homes and make areas uninhabitable. Destruction of homes and regions can displace the people living there to other locations within the state or across countries' border to other locations creating internally displaced persons (IDPs) and refugees. While states with lower levels of willingness and ability are likely to have the problem of IDPs and refugees, countries with higher levels of willingness and ability are not necessarily exempt from this

phenomenon. While it is tempting to consider only cases like the several million refugees and IDPs in places like Darfur, it is important to remember that after Hurricane Katrina, nearly 400,000 people were displaced in the United States.

Displacement can happen quickly when a hurricane or storm makes landfall or flash flooding during seasonal monsoons destroys a region, or it can happen gradually over time as when people gradually move following recurring droughts.

States' willingness and ability to accommodate the needs of displaced people varies. It may be more difficult for people to move transnationally in states that are least willing and able, since non-democratic governments often make crossing borders difficult. In these cases, we are more likely to see internally displace people following natural disasters. In states that are most willing and able, we should see few refugees or internally displaced peoples. In states that are alternately willing and able, we are likely to find more refugees seeking better accommodations in countries that are more willing and able to offer assistance and protection.

Hypothesis 4: Increases in natural disasters should produce more internally displaced people and refugees.

Hypothesis 5: In states that are least willing and able, an increase in natural disasters should produce more internally displaced persons.

Hypothesis 6: In states that are variably willing and able, an increase in natural disasters should produce more refugees.

In the next section I turn to the data and empirical measurement of these hypotheses.

4.4 Data and Methods

To measure the availability of food, I use data from the United Nations Food and Agricultural Organization (FAO) that measures average kilocalories per person by country each year. To measure securing of housing I use data on refugees and internally displaced persons from the United Nations Refugee Agency (UNHCR). Data for natural disasters comes from the Center for Research on the Epidemiology of Disasters (CRED), specifically the International Disaster Database. To capture states' willingness I generate a binary variable for democratic and non-democratic states using the Polity IV data. I use the arbitrary cut point of +6 to distinguish between countries that are willing ('1') and those that are not ('0'). Results are robust with cut points at +5 and +7.

To capture ability, I create a binary measure using data for Relative Political Allocation (RPA) generated by Kugler et al. RPA is a scaled variable between 0 and 2 that incorporates states' general public spending, technology, defense, public order, economic affairs, housing, health, education and social security. ²States whose RPA

²Kugler et al. use the following formula to calculate Relative Political Allocation:

$$\text{Income per capita} = \text{Technology} \times (\text{Capital/GDP})^\alpha \times (\text{GeneralPublic/cap})^{\beta_1} \times (\text{Defense/cap})^{\beta_2} \times (\text{PublicOrder})^{\beta_3} \times (\text{EconAffair/cap})^{\beta_4} \times (\text{Housing/cap})^{\beta_5} \times (\text{Health/cap})^{\beta_6} \times (\text{Education/cap})^{\beta_7} \times (\text{SocialSecurity/cap})^{\beta_8}$$

score is below the annual global average are coded as not able ('0') and those with scores above the annual global average are coded as able ('1').

The primary independent variables, extreme temperatures, droughts, floods, storms, epidemics, and earthquakes, are derived from the CRED database. These variables capture incidence of natural disasters, and number of people killed and affected by natural disasters measured in hundreds of thousands. Table 4.1 shows descriptive statistics for all of the variables in the empirical models.

Table 4.1. Summary statistics of human rights variables

Variable	Mean	Std. Dev.	N
Physical integrity	4.925	2.34	4255
Internally displaced persons	100	434.879	5977
Refugees	62.007	315.845	5869
Kilocalories per person	2547.746	526.093	6731
Drought	2.491	58.205	7851
Extreme heat and cold	0.117	8.708	7851
Flood	3.844	59.238	7851
Storm	0.983	16.721	7851
Epidemic	0.029	0.815	7851
Earthquake	0.202	6.05	7851
Willing and Able	0.934	0.674	6286
Global count of disasters	170.209	127.427	7851
Log of population	15.496	1.936	7513

Relative Political Allocation is calculated as the inefficiency score between a state's ideal spending in these areas versus actual spending. Thus, $RPA = 2 \times (1 - (\text{Country } i\text{'s Inefficiency} - \text{Lowest Inefficiency in Sample}) / \text{Country } i\text{'s Inefficiency} + \text{Lowest Inefficiency in Sample})$.

4.5 Results and discussion

Table 4.2 reports the OLS regression results from three empirical models: the effects of natural disasters on nutritional intake (1. Food security), measured in kilocalories per person; the effects on creation of internally displaced persons (2. IDPs), and the effects on creation of transnational refugees (3. Refugees).

I turn first to the effects of food security and natural disasters. Table 4.3 reports the marginal effects of each type of natural disaster. Under circumstances of extreme heat and cold that affect more than 100,000 people, the availability of food increases in states that are neither willing nor able. Contrary to hypothesis 2, this is a curious finding that runs contrary to the hypothesis, since food availability should decrease in states that are neither willing nor able to feed their hungry citizens. It could be that international humanitarian assistance accounts for this increase in kilocalories per person.

The mean number of kilocalories per person for states that are neither willing nor able is 2,332; the mean for states that are alternately willing or able is 2,522; and the mean for states that are both willing and able is 2,771. Thus, while natural disasters oddly raise the number of kilocalories per person in states that are neither willing nor able, their nutritional baseline is still 15% below states that are both willing and able.

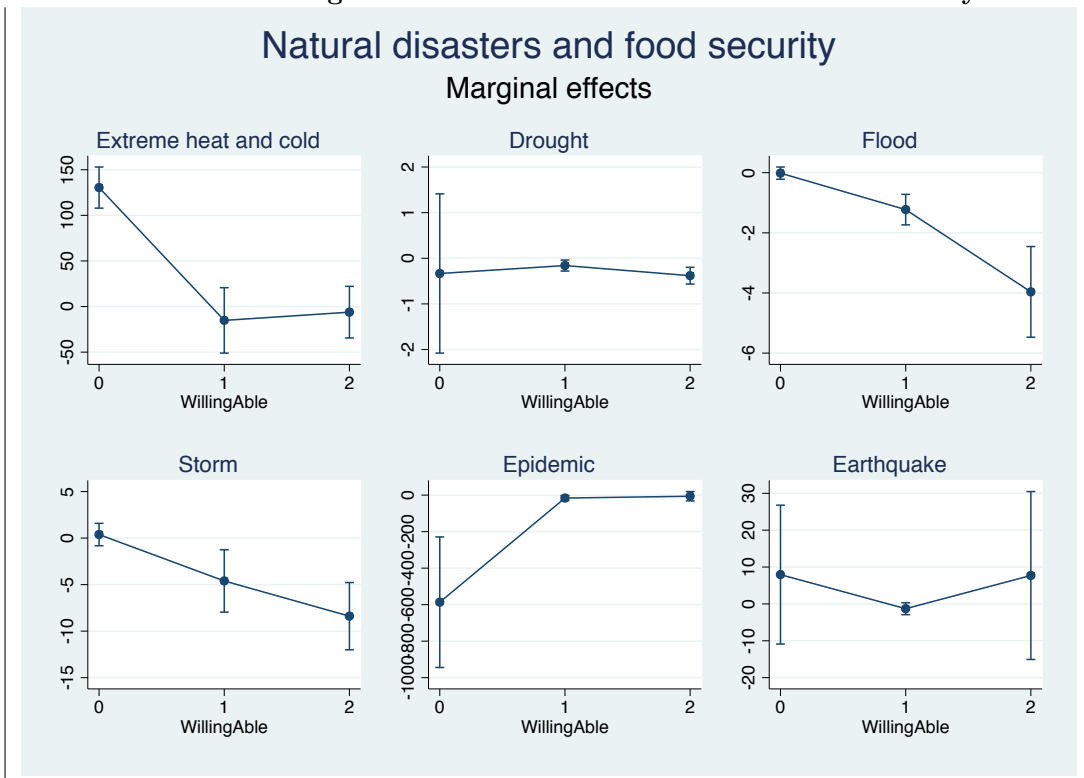
Droughts and floods have no statistically significant effect on the caloric intake of people in countries that are neither willing nor able, but they do decrease the number of calories available to people in countries that are alternately and both willing and

Table 4.2. Natural disaster effects on aspects of human rights

	1. Food security	2. IDPs	3. Refugees
Extreme heat and cold	130.5*** (11.34)	-23.01** (-2.92)	-5.468 (-1.37)
Drought	-0.334 (-0.37)	0.190 (0.39)	0.575 (0.90)
Flood	-0.0148 (-0.14)	-0.0197 (-0.52)	0.0247 (1.81)
Storm	0.380 (0.62)	-0.528 (-1.54)	-0.313 (-0.74)
Epidemic	-586.7** (-3.22)	922.0 (1.22)	320.0 (0.86)
Earthquake	7.942 (0.83)	-12.06* (-2.15)	-4.519 (-0.80)
1 Willing and Able	220.8*** (3.98)	46.79 (1.56)	41.24 (1.10)
2 Willingand Able	460.9*** (6.14)	-34.45 (-1.11)	-24.35 (-1.21)
Log of population	73.67** (2.87)	35.35** (2.64)	13.11 (1.42)
Global count of natural disasters	0.239 (1.59)	0.321* (2.39)	0.0156 (0.30)
1 (Willing + Able) \times (Extreme heat and cold)	-145.7*** (-7.14)	75.71*** (6.67)	43.97 (1.68)
2 (Willing + Able) \times (Extreme heat and cold)	-136.6*** (-7.42)	18.52* (2.55)	4.024 (1.02)
1 (Willing + Able) \times (Drought)	0.174 (0.20)	-0.165 (-0.34)	-0.596 (-0.93)
2 (Willing + Able) \times (Drought)	-0.0478 (-0.05)	-0.239 (-0.49)	-0.499 (-0.78)
1 (Willing + Able) \times (Flood)	-1.213*** (-4.62)	-0.121 (-0.70)	-0.211 (-1.95)
2 (Willing + Able) \times (Flood)	-3.949*** (-5.11)	-0.0802 (-0.17)	-0.177 (-1.31)
1 (Willing + Able) \times (Storm)	-4.987** (-3.13)	-0.422 (-0.37)	-0.920 (-1.11)
2 (Willing + Able) \times (Storm)	-8.771*** (-4.66)	-0.314 (-0.36)	1.121 (1.78)
1 (Willing + Able) \times (Epidemic)	570.6** (3.13)	-917.1 (-1.21)	-319.6 (-0.86)
2 (Willing + Able) \times (Epidemic)	580.5** (3.33)	-926.0 (-1.23)	-324.4 (-0.87)
1 (Willing + Able) \times (Earthquake)	-9.242 (-0.98)	11.57* (2.12)	4.003 (0.72)
2 (Willing + Able) \times (Earthquake)	-0.239 (-0.02)	36.79* (2.23)	5.574 (0.95)
Constant	1096.1** (2.75)	-544.4* (-2.52)	-173.6 (-1.20)
<i>N</i>	4862	4557	4506

t statistics in parentheses* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 4.3. Marginal effects of natural disasters on food security



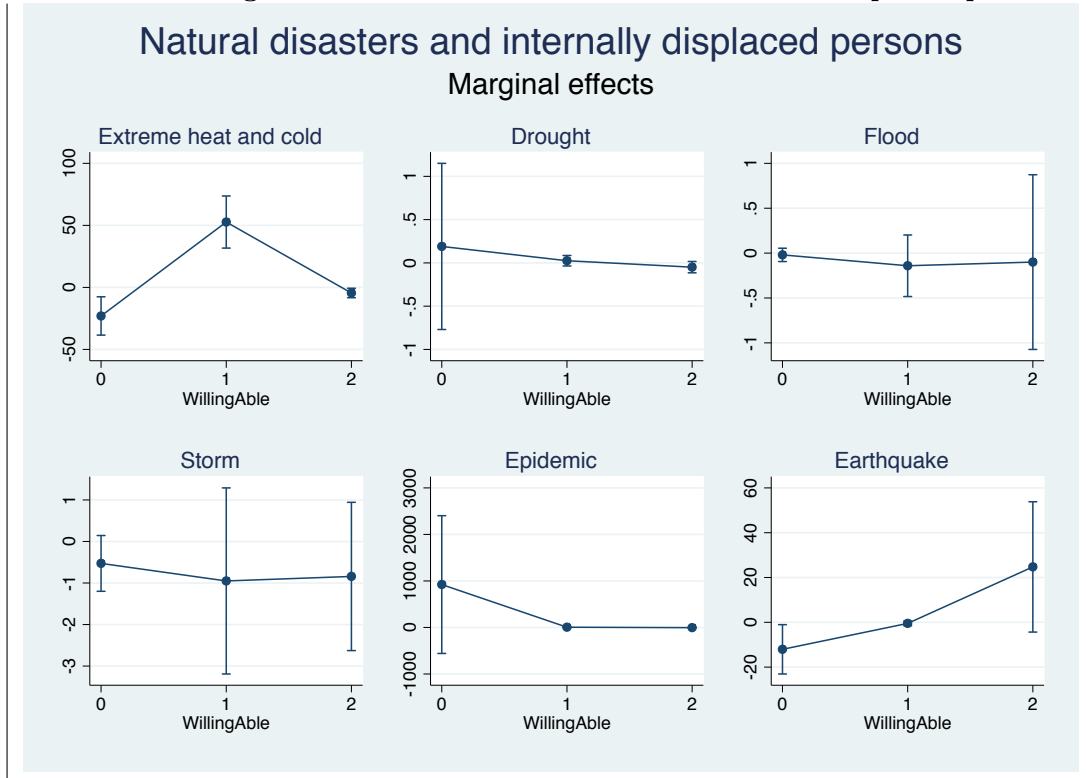
able. The caloric reduction, however, is quite small. Epidemics, on the other hand, reduce the caloric intake in countries that are neither willing nor able quite substantially by nearly 600 kilocalories per person per year. Epidemics can be prevented in many ways, including vaccinations and adequate waste management infrastructure. They can also be exacerbated by other natural disasters, including earthquakes, floods, and extreme temperatures. Unlike earthquakes, however, states have ample ways to prevent epidemics, including administering vaccinations, increasing health care and waste management infrastructure capacity, and vector control strategies.

While I find support for both hypotheses 1 under some circumstances, I do not find support for hypothesis 3 regarding the effects of global natural disasters and food security. There may still be reason to believe that natural disasters that occur within the international system do affect individual countries, but the mechanism may be through food prices rather than actual caloric intake.

Table 4.4 presents the marginal effects of natural disasters on the creation of internally displaced persons. Under the circumstances that all countries were neither willing nor able, extreme temperatures would slightly decrease the number of internally displaced persons. If all countries were alternately willing or able, the number of internally displaced persons would increase. Results are not statistically significant for countries that are both willing and able. These results are what we would expect, since freedom of movement may be difficult to achieve in unwilling states, i.e. those that are non-democratic. Given these states are also unable to address

the consequences of natural disasters, the humanitarian outcomes for people living under these circumstances are likely to be quite poor. In states that are both willing and able, extreme temperatures increase the number of internally displaced persons.

Table 4.4. Marginal effects of natural disasters on internal displaced persons



For states that are neither willing nor able, earthquakes slightly decrease the number of internally displaced persons. It is possible that this outcome, similar to the decrease associated with extreme temperatures, could be attributed to compensatory measures undertaken by the international humanitarian community to offset the deleterious effects of natural disasters. This outcome warrants further exploration.

Table 4.5. Marginal effects of natural disasters on refugees

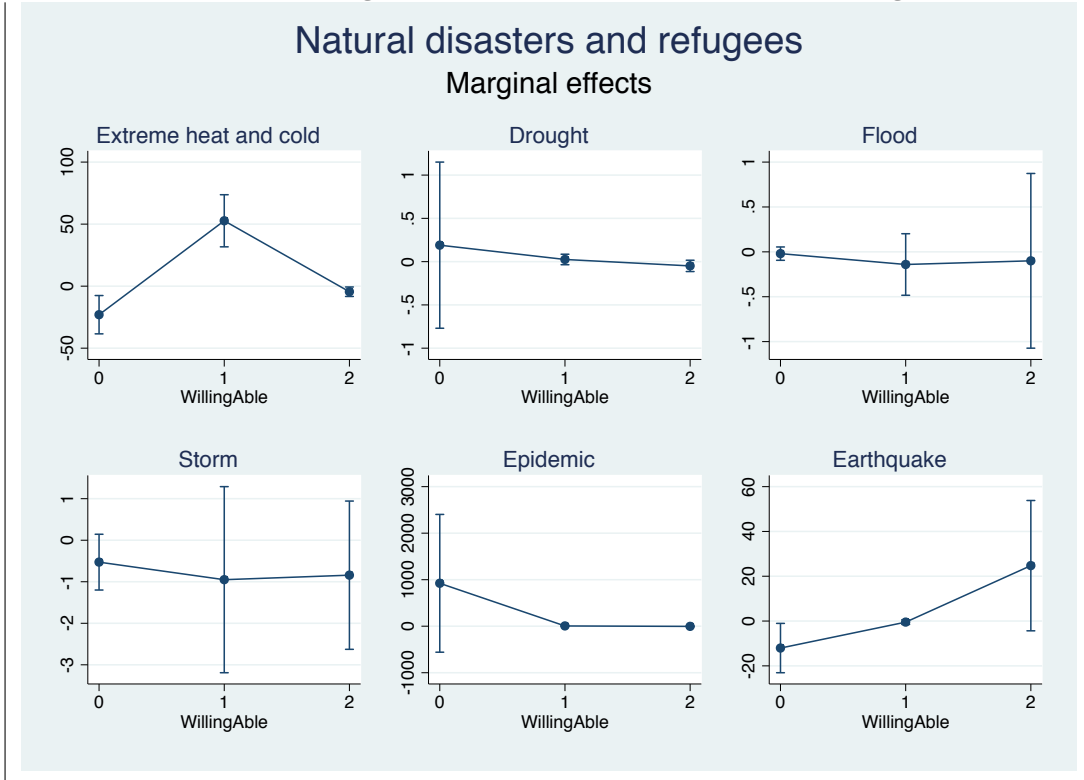


Table 4.5 presents marginal effects for the creation of refugees following natural disasters. The results are similar to those found in the IDP model. For states that are neither willing nor able, extreme temperatures have a negative effect on the creation of refugees. This may be either due to the fact that unwilling, e.g. repressive, non-democratic, regimes can make transnational movement difficult, or it could be that the international community offsets the need to move by providing assistance locally. In states that are alternately willing and able, the number of refugees increases. Results for states that are both willing and able are statistically insignificant.

From a policy perspective, these findings are important because they point to vulnerabilities in societies facing extreme temperatures, epidemics and flooding. States that are the least willing and able may be most likely to receive the most attention from the international community since their citizens' circumstances are most dire. However, the vulnerability of citizens' to displacement is in countries that are alternately willing and able. Contrary to popular assumption and to much attention in recent political science literature, this phenomenon is not solely attributable to being located on the continent of Africa. Many Central American, Eastern European and Southeast Asian countries are included in this category as well.

4.6 Conclusion

Certain types of natural disasters have negative humanitarian consequences on different types of societies. This project takes the scholarship in a new direction to explore the basic human rights consequences of climate disasters. From this project we can learn several important things. Natural disasters do disrupt the status quo, and they impair the provision of basic human rights like access to food and housing.

First, disaster type matters to human rights practices. As measured in the previous statistical models, many natural disasters do not have statistically significant effects on states' human rights practices. This may be due to their relative infrequency, or to the general preparedness efforts that most states undertake, or due to the fact that they affect relatively fewer people than the other types of natural disaster.

Second, a state's willingness and ability conditions how natural disasters affect citizens' human rights. States that are least willing and able often have counterintuitive, improved human rights effects which may be a function of international humanitarian intervention and the already low status of pre-existing humanitarian conditions. States that are alternately willing and able seem to be the most vulnerable to humanitarian consequences like decreased access to food and increased incidence of internally displaced persons and refugees. States that are most willing and able appear largely impervious to the effects of natural disasters.

While the effect of global natural disasters do not play a prominent role in the humanitarian consequences of local natural disasters, there is reason to suspect that global natural disaster shocks matter to states in terms of their ability to secure food supplies. Anecdotal evidence has pointed toward food price increases as sources of discontent which motivated citizens to participate in the Arab Spring protests. Connecting food security to other political phenomena, like civil unrest and contentious behavior, is explored in Chapter 5.

Future research can explore role that humanitarian aid plays in mitigating the negative effects of natural disasters. Future research will also explore another extension of human rights that includes active violation of political and civil rights. This line of research posits that governments may opportunistically use natural disasters to systematically deny relief to minority groups, and may also use the 'cover' of the disaster

to actively repress members of marginalized groups and violate their civil or political rights, including torture, political imprisonment, disappearances and extrajudicial killings.

Chapter 5

CONTENTIOUS BEHAVIOR

As previously noted in Chapter Two, natural disasters affect societies differently, conditioned on regime type. Natural disasters affect people, and people in turn expect that their government will respond to their needs. Governments have many options for responding and their policy choices are dependent on the number of constituents to whom they are accountable, and on the institutions available for responding to natural disasters. State capacity describes the robustness of institutions and economic capacity that matter to a state's ability to respond to natural disasters.

People evaluate their government's and their leaders' responses to natural disasters. Democratic states are characterized by regular, free and fair elections whereby a large proportion of the constituency may evaluate their leaders' performance. Democratic states also protect civil rights, like freedoms of expression and assembly, which provide the opportunity for citizens to legally participate in demonstrations and protests. Non-democratic states, on the other hand, may have irregular elections, or elections for dictators with predetermined outcomes. The electoral process, in other words, may be insufficient for citizens to express their approval or disapproval of leaders' responses to natural disasters.

Furthermore, freedoms of expression and assembly in non-democratic states are not legally protected activities as they are in democratic states. Absent robust electoral institutions, however, citizens may be left with protest behavior as their expression of disapproval of leaders' management of the natural disaster. While social unrest may be present in both democracies and non-democracies, protests in the former tend to be more formulaic and not destabilizing to the existing regime whereas protests in non-democracies tend to have higher stakes.

How can we understand when and under what conditions citizens will exhibit contentious behavior, given the presence of natural disasters? Following heat waves in Pakistan, people protested at the electrical companies and at the capitol. New Orleans, Louisiana residents protested the perceived inadequate government response to the disaster. Farmers in Birmingham protested against their government's response to drought conditions in 2012. In 2010, there were no protests, however, in Russia following a severe heat wave.

If a government's response is deemed sufficient by citizens, no protest should be necessary. However, an absence of protest could also indicate a repressive regime which does not allow political space for protest. The presence of protest indicates disapproval of the government's response, but can have very different significance depending on the type of society in which the protest occurs. Political institutions, government type, and state capacity matter to the presence of protest in society.

Along the lines of Eisinger (1973) and Francisco (1995), Fein (1995) assert a non-linear relationship between social unrest and regime type. Fein innovates a useful term - “More Murder in the Middle” - to describe where social unrest is likely to happen. The theory predicts that semi-democratic states are more susceptible to social unrest because of incoherent application of democratic practices. Paul Collier describes the problems of this situation as an imbalance between instant elections and weak checks and balances. When rules are applied inconsistently in non-democratic states, social unrest is more likely and citizens’ rights are more likely to be violated.

We can extend this theory to the framework of states’ varying willingness and ability. In states that are both unwilling and unable to prepare for or respond to natural disasters, citizens might have ample reasons to want to participate in protest behavior because of worsening humanitarian conditions or unequal provision of relief or compensation. However, the political environment of unwilling states may limit citizens’ ability to engage in contentious behavior as unwilling states are defined here as being non-democratic. States that are most willing and able generally have the most comprehensive disaster preparation and responses, and yet they are not immune to contentious behavior. Protests, strikes and demonstrations in the most willing and able states, while often constitutionally protected, is often unnecessary or less prevalent because of existing formal, institutional processes for resolving grievances. States that are either willing or able - but not both - are most likely to experience the most protest.

States that are alternately willing and able should experience the most protest. In states that are willing but unable to adequately respond to natural disasters, citizens may find themselves with the political mechanisms to hold leaders accountable for inadequate response, but the depth of inadequate response can overwhelm the system's political capacity to correct for its lack of preparation or insufficient compensation.

States that are unwilling but able might also face more protest because of the perceived gap between what the government is capable of providing, and what they actually provide. A government that is able to prepare for and respond to natural disasters, but chooses not to, may face protests from citizens following natural disasters. These circumstances are what Lichbach (1989) calls the "economic inequality-political conflict" nexus, where relative deprivation and perceived inequality spark protest. In these countries, governments are non-democratic and unwilling to accommodate the needs many of their citizens. This is because they are not dependent on a large proportion of their citizens for continued tenure in office. Under these circumstances, most citizens are not part of the selectorate, the group of people required for leaders to remain in office, and as such leaders can deny preparatory or compensatory services to large numbers of people with virtual impunity and little risk of reprisal. They are likely, however, to privilege their much smaller group of supporters with such provisions, an action which may provoke the ire of desperate and needy masses. Under these circumstances, such desperation and need can provoke protest behavior.

This chapter examines sub-national contentious behavior. Many previous studies linking natural disasters with political behavior have focused on dichotomous measures of conflict, like presence of civil war in a given year, or onset. However, to wage a civil war, citizens must overcome collective action problems, secure weapons and articulate grievances. On the other hand, staging a demonstration or protest against government policies sets the threshold for action much lower. Thus while civil wars are relatively rare events, protests and demonstrations happen much more frequently.

Natural disasters can create social unrest through a variety of mechanisms. They can illuminate inadequate government institutions and disparities in society regarding the implementation of government-sponsored relief and assistance programs. Leaders may show demonstrate preferential treatment for some constituents and pay comparatively little attention to the needs of others. When aggrieved people decide to voice their concerns between elections, their grievances may manifest in the form of demonstrations and protests. The effects of natural disasters on contentious behavior is conditional on the type of government in the country where they occur and the capacity of the state to absorb the disaster shock.

As weather patterns become more extreme and natural disasters occur with increased frequency, we may also expect to see more contentious behavior from citizens. Increases in contentious behavior may be a function of increased opportunities to express grievances against governments and leaders. Since governments have a finite

amount of resources to spend on disaster mitigation and relief, their coffers may be more quickly drained with an increase in the frequency, intensity and cost of these events. In the United States, the Federal Emergency Management Agency (FEMA) faced funding shortages following particularly weather-active seasons culminating with the landfall of Hurricane Irene in 2011, and some local and state requests for relief allocation have been denied.

Hypothesis 1: Increased incidences of natural disasters will increase contentious behavior in states that are alternately wiling and able.

Another way in which natural disasters may incite social unrest is when they affect the availability and price of goods, specifically food. An increase in the number of natural disasters happening worldwide can contribute to increases in the prices of food. The effects of natural disasters can travel long distances as well and affect geographically separate regions. The international marketplace is increasingly globalized and interconnected, with many countries dependent upon imports of food and goods from remote places. When natural disasters destroyed wheat crops in Australia and Russia in 2010, the global price of wheat increased.

People in lesser developed countries are more sensitive to increases in food prices, as they tend to spend a greater proportion of their income on basic needs than people in higher-income countries. Countries with large, diverse economies and robust political institutions like those found in democracies should be more likely to weather the

effects of natural disasters with fewer instances of social unrest than non-democratic countries dependent on primary commodities.

Hypothesis 2: Increases in the number of global natural disasters increases the incidence of protest.

Natural disasters are occurring with increased frequency, which may contribute to a corresponding increase in protest. Following Fein's argument, non-democracies may also be more likely to experience some form of unrest given their predisposition to institutional inconsistencies. If citizens feel that elections do not resolve their needs, or if they doubt the legitimacy of election results or are uncertain when the next elections will be, they may be more inclined to take their grievances to the streets.

We should also consider that natural disasters are not all of one type, and that some disasters should be more likely to create conditions for protest. For example, in June of 1991, Pakistan experienced a serious heat wave which killed hundreds of people. Some died as a result of heat-related illnesses and dehydration. Others were affected by secondary causes like food poisoning from unreliable refrigeration. A continual lack of investment in the nation's power grid taxed the capacity of the electrical industry under the searing hot conditions, causing massive power outages across the country. Violent protests in the port city of Karachi targeted the offices of the local electricity supplier and disrupted daily life by burning tires in the streets, prompting a repressive response from local police. In the capital, the opposition

party staged nonviolent demonstrations to highlight the current leadership's shortcomings in responding to the humanitarian needs of Pakistani citizens.

The amount and timing of rainfall and extreme temperatures are exogenous events, and yet even as such can create civil unrest in places like Pakistan when governments fail to provide relief. Secondary natural disasters are less perfectly exogenous. Governments can mandate and facilitate vaccination programs which mitigate or eliminate certain forms of epidemics.

Land-use policies to combat insect infestations, like draining swamps, have reduced the incidence of malaria in developed countries. Governments may also implement land-use policies to address secondary natural disasters like avalanches, landslides, mudslides and subsidence. Countries dependent on primary commodities like timber often have unregulated harvesting practices whereby clear-cutting forests reduces land cover, making mass movements of both wet and dry substances more likely.

The number of natural disasters occurring worldwide, and the numbers of people that they kill and affect, are both increasing. Yet if natural disasters are so severe as to kill or injure large numbers of people, there may be few remaining people in good health to effectively mount protests. Thus, natural disasters, like droughts, floods, storms extreme temperatures and earthquakes, which affect people but do not incapacitate them are likely to incite protests.

Hypothesis 3: As a population is more likely to engage in contentious behavior after natural disasters, protest behavior increases.

5.1 Methods and data

In this section I examine the effects of natural disasters on contentious behavior and social unrest for the time period 1960-2004.

Data for social unrest is taken from Bueno de Mesquita et al., De Mesquita & Smith (2010) who themselves derive the measure of contentious behavior from Arthur Banks' dataset Banks (2011). As the Bueno de Mesquita et al paper describes, Banks' derived his data on subnational contentious behavior, including demonstrations, strikes, riots and revolutions, from news reports. BDM et al suspect that the data is biased in two ways.

First, countries have different baselines for protest behavior, whereby some societies routinely experience protest, and for others it is a rare experience. Second, press reporting varies between countries, which may cause over-reporting in some countries and under-reporting in others. For this reason, BDM et al use a measure that captures the change in protest behavior over three years, which allows each country to have its own unique baseline level of protest.¹

¹BDM et al. generate an index of mass political movements, i.e. demonstrations, riots, strikes and revolutions. They then create a standardized version of the variable: $z = (\ln(1+x) \text{mean}(\ln(1+x))) / (\text{standarddeviation}(\ln(1+x)))$. They then create an index by summing the four standardized variables and dividing by four. Per their coding scheme, "The change-mass variable tells us whether a leader faces an increasing or decreasing level of mass political movements. The use of the three year lag is arbitrary."

Since this variable is continuous, I use ordinary least squares with robust standard errors clustered by country. To measure natural disasters I use data from the International Database at the Centre for Research on the Epidemiology of Disasters (CRED). I include extreme temperatures, droughts, floods, storms, epidemics, and earthquakes as explanatory variables. I also include a variable to control for population size (log of population) derived from World Bank World Development Indicators data.

CRED follows specific rules for coding missing or unavailable data where zero does not represent a value but rather means that no information is available. Information about disaster events, including the numbers killed and affected, comes from United Nations agencies, governments, the International Federation of Red Cross and Red Crescent Societies, and other various agencies Em-dat (2010). I followed the missing data coding scheme instituted by CRED. However, in some cases, EM-DAT data records the incidence of a natural disaster in a given year, but not information about the number affected. In this case, I extend their coding scheme to code the number affected as "0" while retaining the information that indeed a disaster did occur. The variables measuring the number of people killed and affected by the various natural disasters are measured in hundreds of thousands of people.

5.2 Results

Table 5.1 shows results from an Ordinary Least Squares regression, since the dependent variable measuring contentious behavior is continuous. Table 2 shows the

marginal effects at the substantive values of states being both unwilling and unable (coded '0'), states being alternately willing and able (coded '1'), and states being both willing and able (coded '2').

Table 5.1. Natural disasters and contentious behavior

Variable	Coefficient	(Std. Err.)
Extreme heat and cold	-0.081**	(0.029)
Drought	-0.001	(0.002)
Flood	0.000*	(0.000)
Storm	0.000	(0.001)
Epidemic	0.074	(0.442)
Earthquake	0.028 [†]	(0.015)
Willing and Able	-0.033*	(0.014)
Log of population	0.003	(0.004)
Global count of events	0.000**	(0.000)
1 (Willing + Able) × (Extreme heat and cold)	0.130*	(0.053)
2 (Willing + Able) × (Extreme heat and cold)	0.069*	(0.031)
1 (Willing + Able) × (Drought)	0.001	(0.002)
2 (Willing + Able) × (Drought)	0.002	(0.002)
1 (Willing + Able) × (Flood)	0.000	(0.000)
2 (Willing + Able) × (Flood)	0.000	(0.001)
1 (Willing + Able) × (Storm)	-0.004	(0.004)
2 (Willing + Able) × (Storm)	-0.018**	(0.002)
1 (Willing + Able) × (Epidemic)	-0.097	(0.442)
2 (Willing + Able) × (Epidemic)	-0.067	(0.446)
1 (Willing + Able) × (Earthquake)	-0.031*	(0.015)
2 (Willing + Able) × (Earthquake)	-0.051	(0.037)
Intercept	0.017	(0.068)
N	5047	
R ²	0.01	
F _(21,157)	26.443	

The marginal effect of extreme temperatures is statistically significant for states that

are neither willing nor able, and states that are alternately willing and able. In states that are neither willing nor able, the likelihood of contentious behavior decreases under conditions of extreme heat or cold. In states that are alternately willing and able, the likelihood of contentious behavior increases.

Figure 5.1 shows the marginal effects of natural disasters on contentious behavior. Droughts are likely to increase contentious behavior in states that are both willing and able. Floods are likely to increase contentious behavior in states that are neither willing nor able, and in states that are alternately willing and able. Storms are likely to decrease protest behavior in states that are both willing and able, and have not statistically significant effect on the two other categories. Earthquakes are slightly more likely to increase contentious behavior in states that are alternately willing and able.

The results in some disaster categories are modest, but there is evidence that states in the middle category where states are either willing or able are most vulnerable to incidences of contentious behavior. Protest in states that are alternately willing or able is likely due to awareness of unequal provisions of preventive or compensatory measures to the selectorate, or due to the overwhelming effects of the disaster(s) which outpace the government's ability to respond.

These results are important as they point to specific disaster phenomena and vulnerable government types. Natural disasters related to weather and geological phe-

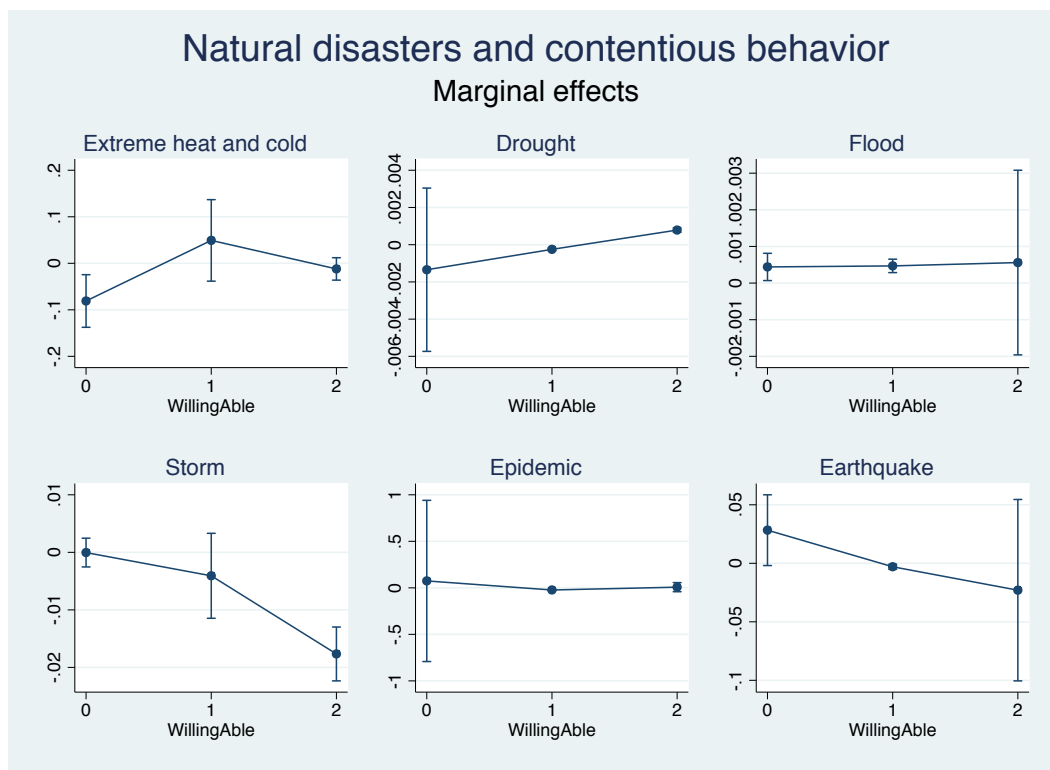


Figure 5.1. Marginal effects of natural disasters on contentious behavior

nomena are likely to increase contentious behavior in non-democracies and in states that are under-prepared for them. This is especially relevant for policies related to climate and weather, as patterns of these phenomena intensify and affect more people. While natural disasters affect all societies, their negative consequences in the form of contentious behavior disproportionately affect non-democracies. Governments can enact general preparedness policies to address contingencies related to geological phenomena like earthquakes and volcanoes, but they have considerably more control over policies related to weather and climate.

Governments can provide facilities for citizens seeking relief from extreme hot and cold temperatures, and they can build levees and dams to mitigate flooding. Governments can provide for human and physical security during and after natural disasters, and can provide compensation to their citizens for their losses. As other researchers have demonstrated, leaders can reap rewards in extended tenure in office by providing benefits to their constituency related to disaster relief (Achen *et al.*, 2004; Healy & Malhotra, 2009; Bechtel & Hainmueller, 2011). Leaders and governments can buffer against destabilizing contentious behavior by enacting policies and cooperating with other states and international agencies to better provide for their citizens.

Chapter 6

CONCLUSION

This project represents an extension of the contributions made predominantly by the civil war literature to the study of how the environment affects political behavior. I have examined the effects of floods, droughts, storms, epidemics, extreme temperatures, and earthquakes on other political phenomena, like the tenure of leaders in office, the human rights consequences, and the sub-national contentious behavior outcomes related to the presence of natural disasters.

This research distinguishes between states that are willing and able to prepare for and respond to natural disasters. The theoretical distinction is important, given that states must be both willing and able to address the consequences of natural disasters in order to avert politically undesirable consequences, like a decrease in respect for human rights, an increase in contentious behavior, and from the perspective of leaders, a decrease in their time in office.

States that are democratic should be more willing, and states that are not democratic should be less willing to prepare for and respond to natural disasters. The concept of willingness is derived from the different political mandates facing types

of leaders. Since democratic leaders are accountable to a wider constituency than are non-democratic leaders, they have a greater incentive to provide public goods related to disaster prevention and mitigation.

The concept of ability refers to states' economic and institutional capacity for responding to natural disasters. States that are able to address problems created by natural disasters are characterized by large, diverse economies that can absorb the economic shocks that disasters create. States that are unable to absorb these shocks often are characterized by high rates of poverty, high social inequality, and economies based on primary commodities, often agricultural, that make them particularly vulnerable to natural disasters.

States can be both willing and able, alternately willing and able, or neither willing nor able to address the problems of natural disasters. States that are both willing and able are least vulnerable to negative consequences. States that are neither willing nor able seem to be buoyed by external forces, as yet unexplored in this context. Anecdotal evidence and other areas of political science research support the idea that states that are neither willing nor able may be the most likely candidates for international assistance. States in the middle, i.e. those which are either willing but unable or unwilling but able, seem to be more vulnerable than states that lack both willingness and ability.

Future research will explore these two middle categories, disentangling their effects as separate and distinct political processes. It is possible that states which are willing but unable, i.e. poor democracies, and states that are unwilling but able, i.e. rich non-democracies, have separate and distinct political phenomena which warrant separate categories. While this work classified them in the same category, future work disaggregating them may provide more insight.

This project has shown that different types of natural disasters affect political processes in unique ways. I have also found some support for the idea that global natural disasters affect local political processes as well. Countries that are varyingly willing and able to prepare for and respond to the demands that natural disasters create are differently affected by natural disasters. Countries that are most willing and able are least affected by contentious behavior, have the most modest human rights effects, but the greatest effect on leadership tenure.

In countries that are most willing and able, leaders are most vulnerable to shorter tenures subsequent to floods and when there are more natural disasters happening in the international system. Results for leaders in states that are neither willing more able are statistically insignificant, but the hazard rates are in the expected (decreasing) direction.

Countries that are least willing and able are oddly affected by human rights, where their food intake and food security issues improve with increased natural disasters,

specifically extreme heat and cold. It is noteworthy that while this effect is curious, and statistically significant, the baseline caloric intake for citizens in states that are neither willing nor able is lower than that of citizens in states that are alternately and both willing and able. Droughts, floods, and storms also decrease food security. In states that are alternately willing and able, extreme temperatures increase the number of internally displaced persons and refugees.

Future work on the topic of contentious behavior should include event data analysis of specific types of contentious behavior and natural disasters, as well as geospatial coding or spatial econometric analysis of the phenomena. This work represents a first attempt at quantifying the relationship between the presence of natural disaster events which affect and kill people throughout the world. As we have learned, the presence and degree of social unrest in the form of protests, strikes and demonstrations following natural disasters can vary depending on states' willingness and ability, and on the type of disaster.

While this dissertation represents an improvement in the ways we understand how natural disasters affect political behavior, much work remains to be done. Natural disasters are demanding of political processes, and this work can provide a theoretical foundation for future case studies involving leadership transitions, the relationship between protest and disasters, and the humanitarian and human rights consequences that natural disasters create.

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Education

ABD, Political Science, The University of Mississippi. Expected: August 1, 2012

Dissertation: The Political Implications of Natural Disasters

M.A., Political Science, The University of Memphis, 2005.

Thesis: The Impact of Humanitarian Crisis on Structural and Direct Violence.

B.S., Linguistics, Georgetown University, 1998.

Professional Experience

The University of Mississippi, Instructor, Fall 2010-

The University of Mississippi, Graduate Research Assistant, Fall 2008-Spring 2010

The University of Memphis, Instructor. Fall 2006, Spring 2011-

Columbia College, Instructor. Fall 2006.

Working Papers

“The Composition of United Nations Peacekeeping Operations.” With Megan Shannon (Florida State) and Jake Kathma (SUNY Buffalo).

(To be presented at APSA 2012, New Orleans)

“Climate Change and Regime Stability.”

(To be presented at ISA 2012, San Diego, CA.)

“Exogenous Climate Shocks and Contentious Behavior”

“Losing Respect: When Does Climate Change Degrade Human Rights?”

Publications

“Ecological migrants, Gender and Security: The Case of the U.S. and Mexico.” with Nicole Detraz. (Under review)

“Gone With the Wind? Leadership Tenure and Natural Disasters.” (Under review)

Courses Taught

International Conflict, The University of Mississippi

International Organization, The University of Memphis

Introduction to International Relations, The University of Mississippi

Introduction to American Government, The University of Memphis

Politics of Developing Nations, The University of Memphis and Columbia College

Revolutions and Political Violence, The University of Memphis

Conferences

Paper Presentation, American Political Science Association, New Orleans, LA, August 2012

Paper Presentation, British International Studies Association, Edinburgh, Scotland, June 2012

Paper Presentations, International Studies Association, April 2012

Journeys in World Politics, November 2011

Panel Presenter, Mississippi Political Science Association, Jackson, MS, November 2011

Discussant, Southern Political Science Association, Atlanta, GA, January 2010

Poster Presentation, American Political Science Association, Toronto, Canada, August 2009

Panel Presenter, Southern Political Science Association, New Orleans, LA, January 2008

Poster Presentation, American Political Science Association, Chicago, IL, September 2007

Panel Presenter, UNESCO Conference on Intercultural Education, Jyväskylä, Finland, June 2003

Awards

Travel grant, The American Political Science Association (Annual conference), Fall

2012

Travel grant, The Society for Political Methodology (Annual conference), Summer 2012

Dissertation Fellowship, The University of Mississippi, Spring 2011

Best Graduate Paper, The Mississippi Political Science Association Annual Conference, Fall 2011

University of Mississippi Graduate School Summer Research Award, Summer 2010

Martin Luther King, Jr. Human Rights Award, April 2010

The Lewis Edward Moore, Sr. Memorial Award for Outstanding Graduate Paper in Tennessee, 2006

National Peace Corps Association Peace Educator of the Year Award, December 2003

Teacher of the News Award Nominee, March 2000

Professional Development and Community Service

Visions in Methodology Mentor/Mentee with Gary King (Harvard), Spring 2012

ICPSR, The University of Michigan, 2010

Organizer, Sharing the Waters: A Conference on Water Conflicts, Oxford, MS, 2010

Founder, Ole Miss Graduate Students Methods Group, 2010-

Pi Sigma Alpha, 2005-

Other Experience

Bosana Foundation Board Member, 2010-

Freelance Journalist, Commercial Appeal, Memphis, TN, November 2009-present

BioDimensions/AgBioworks Consultant, Memphis, TN, 2008-2009

Center for Urban Child Policy at The Urban Child Institute, Memphis, TN, 2005-2008

Bikram Yoga Memphis, Instructor, November 2005-present

Nuclear Age Peace Foundation, Santa Barbara, CA 2001-2003

The World Bank, Washington, DC, 1998

Languages

Fluent in English, French and Spanish